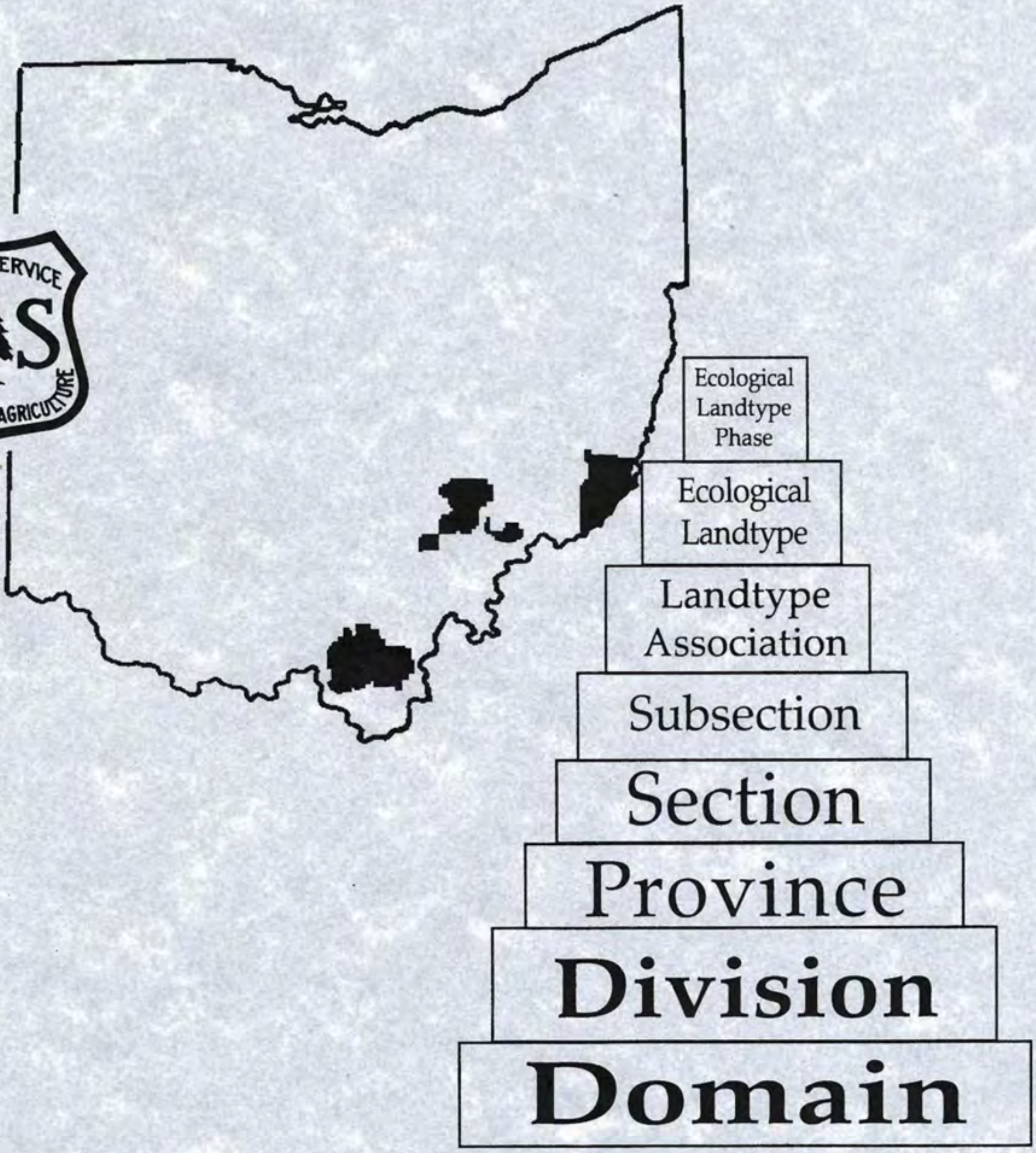
United States
Department of
Agriculture

Forest
Service

Wayne
National Forest

Wayne
National Forest

Ecological Classification Handbook


Ecological Landtype Phase
Ecological Landtype
Landtype Association
Subsection
Section
Province
Division
Domain

WAYNE NATIONAL FOREST
ECOLOGICAL CLASSIFICATION HANDBOOK

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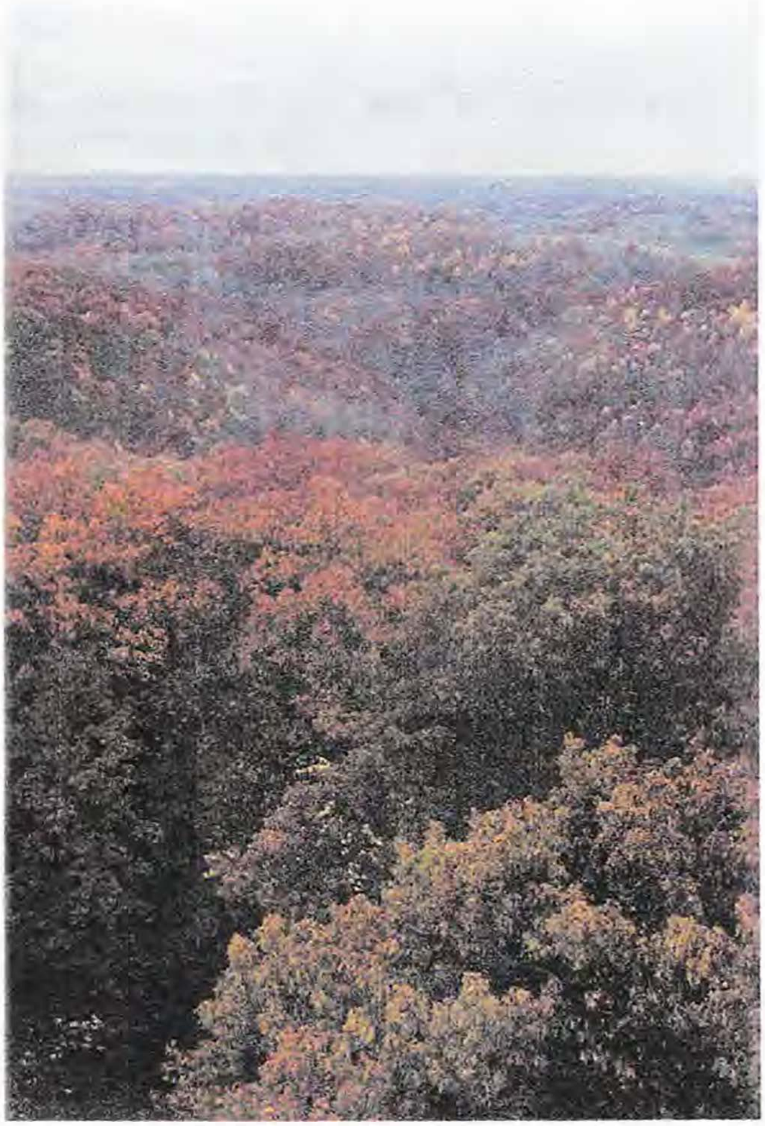
Abstract:

This Ecological Classification System for the Wayne National Forest was developed over a 6 year period, 1991-1997 by a joint effort between Ohio State University, Miami University, Wright State University, the Delaware Forestry Laboratory - NEFES, and the Wayne. An Ecological Classification system is intended to help identify potential natural vegetation and soil moisture and fertility characteristics that influence plant communities.

Data was collected on a total of 378 plots across the Wayne over a four year period in Forests that were at least 70 years old or older and were relatively undisturbed. Data collected included tree species, crown class, woody seedlings, ground flora, standing snags, fallen logs, slope, aspect, slope length, slope shape, elevation, soil characterisitics, and site index. These were then analyzed to separate out the factors that played the most important role in influencing forest vegetation.



Analysis of the data resulted in seven Ecological Land Types (ELT's) on the Forest. Attempts to combine District data into a single Classification System for the Forest were not successful as the Marietta Unit, located on a different subsection, was distinct from the Ironton and the Athens Units, which shared several ELT's. ELT's were further classified into smaller units known as Ecological Land Type Phases which are smaller units with distinct characteristics that are recognizable on the ground. Of the factors that influence the forest communites on the Wayne, Landform and aspect were found to be the most important.

1.0 Introduction

1.1 Hierarchy System

1.11 Explanation

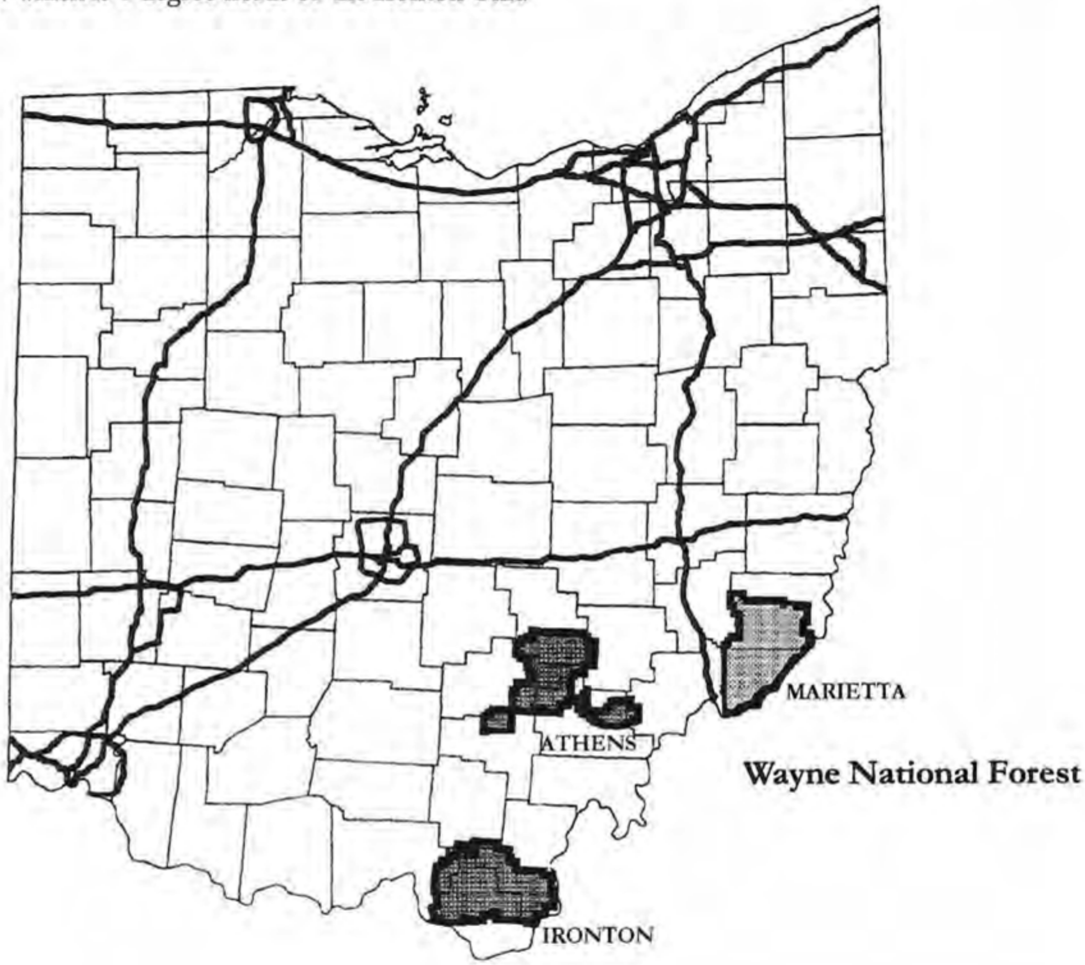
This National Hierarchy was established to provide a common spatial framework among government agencies (country, state, nation) and nongovernmental organizations who work with land in the United States of America and their territories.

The objectives of this ecological classification system (ECS) are to provide an integrated ecosystem classification based on potential natural communities, soils, and physical characteristics that could be used for mapping , analysis, monitoring, evaluation and data base linkages. It is also to provide a unifying ecosystem framework for use in land and resource planning and management for making interpretation of ecosystem responses to management, treatment, disturbances and development over time. It will also aid in evaluating land capability, interpreting ecological relationships and improving multiple-use management.

See References 5.6 for figures, tables, and maps of the Ecoregions of the USA and the hierarchical nature of ECS.

1.2 Study Area

The three units of the Wayne National Forest are located in southeastern Ohio. The Marietta Unit is the most easterly (81 degrees 15' W vs 82 degrees 30 ' W) of the three administrative divisions that comprise about 89,000 hectares (220,000 acres). Marietta and Athens have a latitude of 39 degrees 30'N which is 1 degree north of the Ironton Unit.



1.21 Climate

The climate is continental with moderate extremes of temperature and precipitation. Summers are hot and humid, while winters are cool. Approximately equal amounts of precipitation are normally received during the spring and summer compared with autumn and winter. Ironton has temperature extremes about 1 degree higher then Marietta, and receives about 51 mm more precipitation, primarily during the growing season. Athens and Marietta receive virtually the same amount of precipitation. The average length of the freeze-free period is approximately 180 days for both the Marietta and Ironton Units and about 160 days for the Athens Unit.

See Reference 5.9, Climatic Data for Temperature and Precipitation Averages.

1.22 Physiography

Working down from the broadest level of classification, the Wayne National Forest is in the:

- Humid Temperature Domain
  - Hot Continental Division [220]
    - Eastern Broadleaf Forest (Oceanic) Province [221]
      - Southern Unglaciated Allegheny Plateau Section [221E]
        - *Marietta* – Ohio Valley Hills Subsection [221Ec] (Permian Hills*)
        - *Ironton and Athens* – East Hocking Plateau Subsection [221Ed] (Monogahela Transition Zone*)
        - West Hocking Plateau Subsection [221Ef] (Ohio/Kentucky Carboniferous Plateau*)

* USEPA Ecoregion Title

An early land system inventory for the Forest indicated that the majority of the landscape could be mapped as maturely dissected uplands of three local relief classes; the remainder consists of broad river valleys and floodplains (Wester, 1970). The typical slope has a steepness gradient of 22-55 percent; one to three benches may be present. These benches are areas of exposed sandstone bedrock more resistent to erosion than the bedrock of the slope segments above or below it.

1.23 Geology and Soils

Inter-bedded sedimentary strata of the Permian age characterize the bedrock geology of the Marietta Unit, while strata underlying the Athens and Ironton Units are of Pennsylvanian age. The common lithologic types are sandstone, shale, siltstone, limestone and coal. Most soils of the study area have formed in parent material of some sequence of loess, colluvium and residuum from these rock types. The majority of the soils are deep or moderately deep and well-drained or moderately well- drained. Predominant soils are classified as fine-loamy or fine, mixed, mesic, Typic Hapludalfs and Typic Hapludults, including the following soil series: Westmoreland, Guernsey, Dekalb, Gilpin, Summitville, Upshur and Vandalia. The average depth to bedrock is 20-40 inches.

1.24 Vegetation

The Forest is part of the mixed mesophytic forest region (Braun, 1950). Gordon (1969) described the original (natural) vegetation types of the area as mixed oaks, mixed mesophytic, and beech forests. The two major forest type groups are upland oaks and cove hardwoods. See Figure 5.8 for a map of the Natural Vegetation of Ohio at the time of earliest land surveyors.

Most forest stands in southeastern Ohio are not pre-settlement in origin, in other words they have been disturbed (harvested and then possibly cultivated or grazed) one or more times since settlement by European immigrants in the late 1700's (Gordon 1969) . Many stands are presently of sprout-origin, having established after heavy cutting approximately 80 to 140 years ago. Although about 95 percent of the study area was forested two hundred years ago, only about 64 percent remains dominated by primarily second-growth forests.

1.3 Uses of the Ecological Classification System

While the uses are described somewhat in section 1.11 above, additional uses include coordinating and integrating resource inventories and to stratify land and resource production capability and make predictions and interpretations for management. It is also to identify ecological units in inventory and use them in monitoring and evaluation, planning and to make predictions and interpretations for resource management on National Forest System lands. They will also aid in coordinating the characterization of ecological types and potential natural communities and the location and sampling of reference sites with other agencies.

1.4 Development of Wayne National Forest Ecological Classification System

The Ohio State University and the USDA Forest Service cooperated during 1991-1997 for the development of this classification system.* Separate inventories of mature forests of the Athens, Ironton and Marietta units were conducted during the summer months of 1992-1995. Differences were observed between the units based upon bedrock geology, macro-climate and land-use history.

* See Credits (Page 2) for a list of those involved.

2.0 Landtype Associations of the Wayne National Forest

The Wayne National Forest occurs in a fairly homogenous landscape compared with other Eastern Region national forests, such as those of the Great Lakes region which are strongly influenced by glaciation, or those of New England which are characterized by strong topographic relief. Due to this homogeneity on the Wayne, conclusions regarding the natural occurrence or distribution of Land Type Associations (LTAs) cannot be drawn from the statistical data collected.

The LTAs on the Wayne are likely to be the Subsections found in 1.22 above: West Hocking Plateau [221Ef], East Hocking Plateau [221Ed], and Ohio Valley Hills [221Ec].

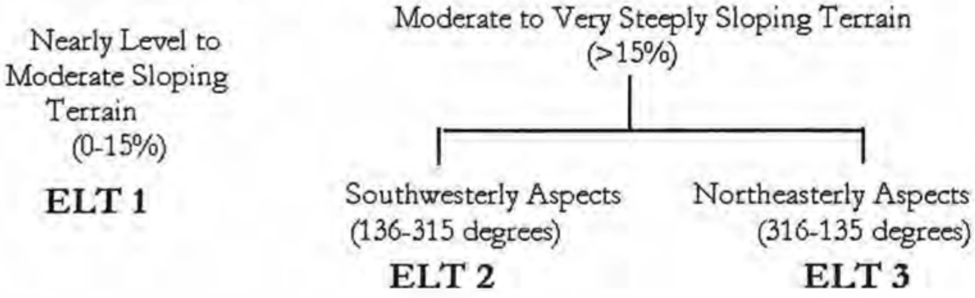
3.0 Ecological Landtypes on the Wayne National Forest

The broadest unit of identification is called an Ecological Landtype (ELT). The majority of ELTs on the Wayne are determined primarily by landform, aspect and slope position.

Each of the ELTs is then further subdivided into units called Ecological Landtype Phases (ELTPs) on the basis of additional differences in vegetation, soils, and physiography. The classification system is designed to identify sites 1 acre or larger. Small areas of atypical condition or areas of transition may not fall into any classification listed here, but the majority of sites on the Forest will fit into one of the classifications described herein. Another problem with classifying a site may be found in areas where historical and disturbance facts alter the ecological potential of a site. Such factors can cause variability on any site, but affect recently disturbed sites the most.

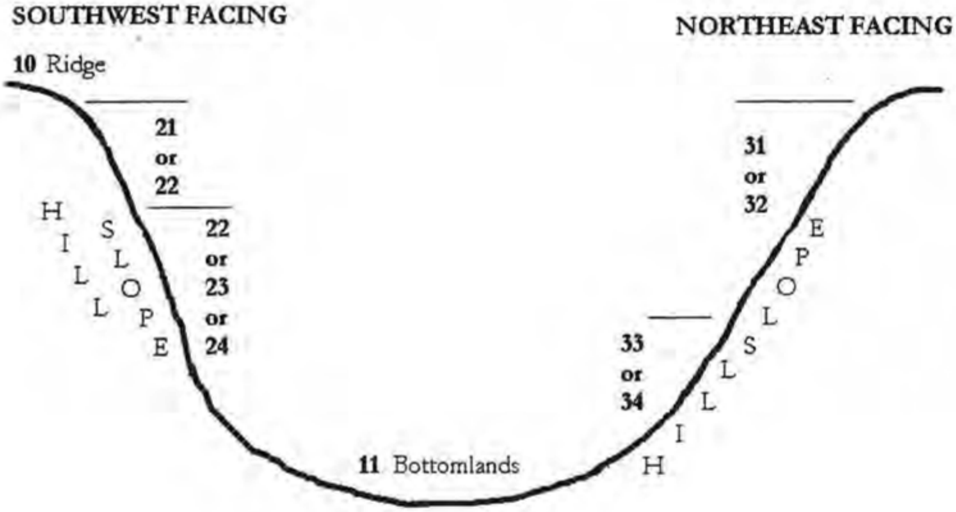
3.1 ELTs on the Marietta Unit

Figure 3.1 Marietta Unit's Ecological Landtypes


Nearly Level to Moderate Sloping Terrain (0-15%)
ELT 1
Moderate to Very Steeply Sloping Terrain (>15%)
Southwesterly Aspects (136-315 degrees)
ELT 2
Northeasterly Aspects (316-135 degrees)
ELT 3

3.2 ELTs on the Ironton and Athens Units

Figure 3.2 - Ironton and Athens Unit Ecological Landtypes


SOUTHWEST FACING
NORTHEAST FACING
10 Ridge
21 or 22
22 or 23 or 24
HILL SLOPE
31 or 32
33 or 34
SLOPE
HILL
11 Bottomlands

4.0 Ecological Landtype Phases (ELTPs) on the Wayne National Forest

Units called Ecological Landtype Phases (ELTPs) are delineated based on differences in vegetation, soils, and physiography. The classification system is designed to identify sites 1 acre or larger. Small areas of atypical condition or areas of transition may not fall into any classification, but the majority of sites on the Forest will fit into one of the classifications described here. Classification may also be impacted by disturbances which alter the ecological potential of a site. Such factors can cause variability on any site, but affect recently disturbed sites the most.

CLASSIFICATION AND DESCRIPTIVE FEATURES -
Several features are used to consistently compare and describe each ELT and ELTP.

TREES (canopy): The Latin names of the most prevalent trees in the forest canopy (overstory or dominant vegetation type) are listed here. Chapter 5, Section 3 includes a translation of Latin to Common Names.

HERBACEOUS: The Latin names of the vegetation on the forest floor are listed here. The forbs, herbs, and smaller flowering plants which are found beneath the main forest trees are described here. See Chapter 5, Section 3 for a translation of common names of these herbaceous species.

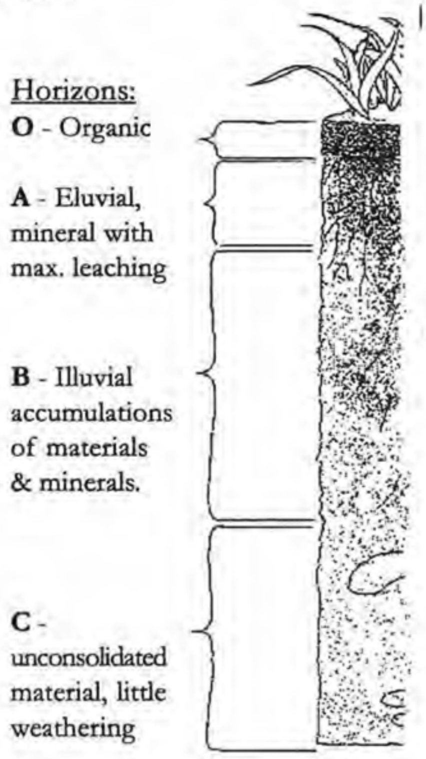
SOIL:

Soils are described by several distinctive characteristics:

Horizons are the layers of soil development which provide bands in different sequences and at different depths, each combination of horizon profiles is characteristic of a soil type.

Characteristics of type of materials are generally described as silts, loams, and/ or clays.
Loam is a rich mixture of clay, sand and organic matter.
Clay is fine particles of material, chiefly aluminum silicate.
Silt is also fine particles deposited by water or wind.

Depth to Mottling. Mottled is a condition of alternate good and poor aeration which is indicative of poor drainage and is not conducive to good plant growth.


Horizons:
O - Organic
A - Eluvial, mineral with max. leaching
B - Illuvial accumulations of materials & minerals.
C - unconsolidated material, little weathering

SOIL Profile

WOODY DEBRIS:

Standing dead wood. Snags (dead trees) > 10.0 cm DBH (diameter breast height) were measured for diameter. Their height was visually estimated to the nearest meter.

Fallen dead wood. Each fallen log with a minimum mid-diameter >10 cm was measured for length, species (if determinable), type (single tree or branch), and decay class (recent, solid, solid-decayed, well decayed). Each measurement was recorded. Mid-length diameter was estimated to the nearest cm, and length to the nearest meter.

Woody Debris Measurements:

Density: number of stems per hectare (#/H)
Basal Area: meter square per hectare (m^2/H)
Volume: meter cubed per hectare (m^3/H)

Seedlings: measured within eight 2-meter square subplots

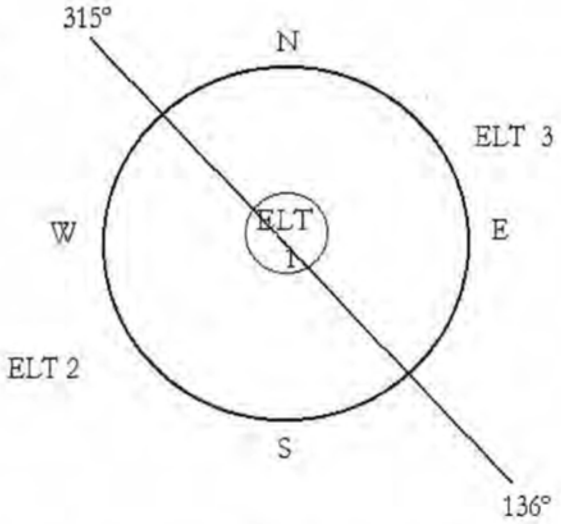
Small Seedlings = number of woody seedlings < 30 cm tall
Medium Seedlings = number of woody seedlings > or = 30 cm and < 90 cm tall
Large Seedlings = number of woody seedlings > 90 cm

Saplings: measured with 100-meter square subplots

Small Saplings = number of woody stems > 1.37m tall and < 5.0 cm dbh
Large Saplings = number of woody stems > 1.37m tall and > or = to 5.0 cm & < 10.0 cm dbh

4.1 Marietta ELTPs

Figure 4.1 ELTs and ELTPs on the Marietta U


315°
N
ELT 3
W
ELT 1
E
ELT 2
S
136°

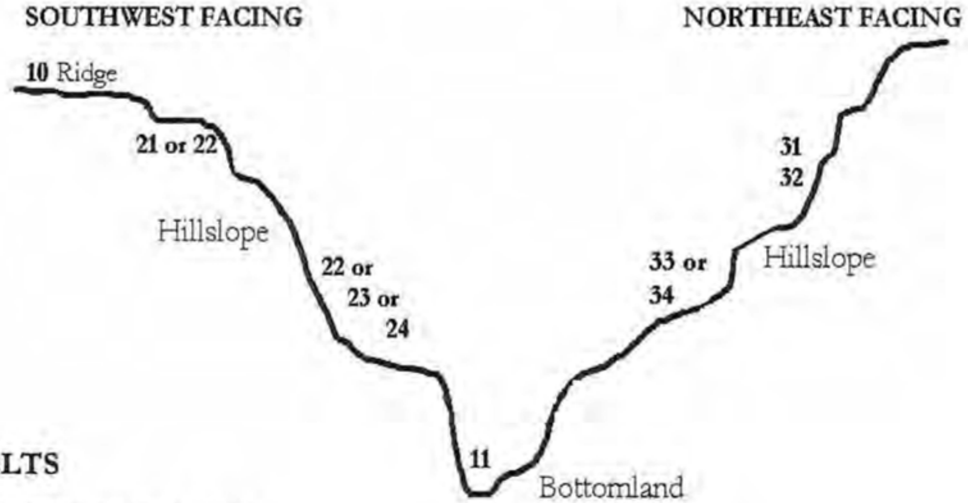
Topographic Features of ELTs:

1 - Nearly level to moderately sloping terrain (0-15%)

2 - Moderate to very steeply sloping terrain (>15%) and southwesterly aspects (136-315º)

3 - Moderate to very steeply sloping terrain (>15%) and northeasterly aspects (316º-135º)

To key out an ELTP, the appropriate ELT designator is found first. This serves as the first digit in the ELTP. After determining the first digit, the second and third digits are based on other characteristics described below.


SOUTHWEST FACING
NORTHEAST FACING
10 Ridge
21 or 22
Hillslope
22 or
23 or
24
11
Bottomland
33 or
34
Hillslope
31
32

MARIETTA ELTS

UPLANDS & BOTTOMLANDS

10 Dry Narrow Ridgetops
11 Wet - Mesic Ravine Bottoms

SOUTHWESTERLY ASPECTS

21 Dry Upper Hillslopes
22 Dry Mesic Hillslopes
23 Dry Mesic Lower Hillslopes - White Oak - Viburnum
24 Dry Mesic Lower Hillslopes - White Oak - Anemonella

NORTHEASTERLY ASPECTS

31 Dry Mesic Upper Hillslopes
32 Mesic Upper Hillslopes
33 Mesic Lower Hillslopes - Mixed Hardwoods - Lindera
34 Mesic Lower Hillslopes - Mixed Hardwoods - Cryptotaenia

MARIETTA

ELTP 10 Dry narrow Ridgetops/ Chestnut oak, White oak - Greenbrier

CLASSIFICATION

TREES (canopy): *Quercus prinus, Quercus alba, Quercus rubra, Acer saccharum, Quercus velutina*

HERBACEOUS: *Smilax glauca, Galium circaezans, Danthonia spicata*

Danthonia spicata

Gallium circaezans

Smilax glauca

SOILS:

Horizon	Thickness (cm)	Characteristics
A	9	loam and silt loam
B	65	clay loams
Depth to Mottling	27	

DESCRIPTIVE FEATURES*

WOODY DEBRIS:

	Density	Basal Area	Volume
standing dead wood	29.7 stems/hectare	2.1 m^2/hectare	13.5 m^3/hectare
fallen dead wood	169.7 stems/hectare	6.6 m^2/hectare	71.1 m^3/hectare

Seedlings				Saplings		
Species	Small	Medium	Large	Species	Small	Large
Acer saccharum	418	19	0	*Acer saccharum*	157	16
Acer rubrum	327	2	0	*Acer rubrum*	9	9
Prunus serotina	145	7	0	*Cornus florida*	37	4
Fraxinus pennsylvanica	107	12	0	*Aesculus octandra*	2	1

* See pages 9-10 for explanation of terms.

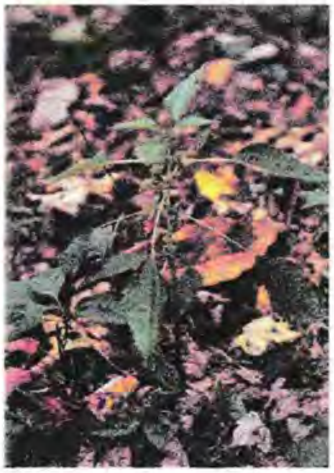
MARIETTA

ELTP 11 Wet Mesic Ravine Bottoms/ Yellow poplar, Sugar maple - Stonecrop, Wood nettle

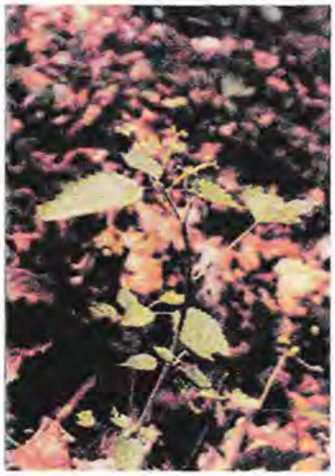
CLASSIFICATION

TREES (canopy): *Liriodendron tulipifera, Fagus grandifolia, Platanus occidentalis, Tilia americana, Acer saccharum*

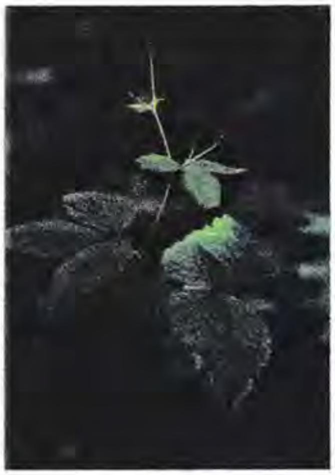
HERBACEOUS: *Cryptotaenia canadensis, Laportea canadensis, Pilea pumila, Phlox divaricata*



Pilea pumila



Laptorea canadensis



Cryptotaenia canadensis

SOILS:

Horizon	Thickness (cm)	Characteristics
A	10	loam and silt loam
B	33	clay loams
Depth to Mottling	40	

DESCRIPTIVE FEATURES*

WOODY DEBRIS:

	Density	Basal Area	Volume
standing dead wood	5 stems/hectare	0.4 m^2/hectare	3.2 m^3/hectare
fallen dead wood	97.5 stems/hectare	3.4 m^2/hectare	27.3 m^3/hectare

Seedlings				Saplings		
Species	Small	Medium	Large	Species	Small	Large
Tsuga canadensis	568	0	0	*Acer saccharum*	57	7
Acer saccharum	256	24	1	*Fagus grandifolia*	26	2
Ulmus rubra	129	11	0	*Lindera benzoin*	53	0
Fraxinus americana	33	7	0	*Asimina triloba*	28	0
Liriodendron tulipifera	17	1	0			

* See page 9-10 for explanation of terms.

MARIETTA
ELTP 21 Dry upper hillslope/ Chestnut oak - Goldenrod, Greenbrier

CLASSIFICATION

TREES (canopy): *Quercus prinus, Quercus alba, Quercus velutina, Acer rubrum, Quercus rubra.*

HERBACEOUS: *Rosa carolina, Solidago caesia, Smilax rotundifolia, Panicum boscii, Podophyllum peltatum*

Rosa carolina

Smilax rotundifolia

SOILS:

Horizon	Thickness (cm)	Characteristics
A	11	loam and silt loam
B	41	clay loams
Depth to Mottling	26	

DESCRIPTIVE FEATURES*

WOODY DEBRIS:

	Density	Basal Area	Volume
standing dead wood	13.3 stems/hectare	0.8 m^2/hectare	5.1 m^3/hectare
fallen dead wood	165.0 stems/hectare	37.3 m^2/hectare	53.5 m^3/hectare

Seedlings				Saplings		
Species	Small	Medium	Large	Species	Small	Large
Acer saccharum	506	21	2	*Acer saccharum*	45	10
Acer rubrum	325	9	2	*Acer rubrum*	57	7
Prunus serotina	175	7	0	*Cornus florida*	26	3
Cornus florida	39	8	2	*Quercus rubra*	1	2
Fraxinus pennsylvanica	109	1	0			
Fraxinus americana	17	16	0			

* See page 9-10 for explanation of terms.

MARIETTA

ELTP 22 Dry mesic hillslopes/ Chestnut oak, White oak - Tick trefoil, Goldenrod

CLASSIFICATION

TREES (canopy): *Quercus prinus, Quercus alba, Quercus velutina, Acer rubrum, Quercus rubra.*

HERBACEOUS: *Vaccinium pallidum, Kalmia latifolia, Desmodium nudiflorum, Aspelnium platyneuron, Sanguinaria canadensis*

Vaccinium pallidum

Desmodium nudiflorum

SOILS:

Horizon	Thickness (cm)	Characteristics
A	9	loam and silt loam
B	65	clay loams
Depth to Mottling	56	

DESCRIPTIVE FEATURES*

WOODY DEBRIS:

	Density	Basal Area	Volume
standing dead wood	31.4 stems/hectare	2.1 m^2/hectare	15.9 m^3/hectare
fallen dead wood	73.3 stems/hectare	2.4 m^2/hectare	20.3 m^3/hectare

Seedlings				Saplings		
Species	Small	Medium	Large	Species	Small	Large
Acer rubrum	191	32	2	*Acer rubrum*	118	15
Quercus prinus	145	17	0	*Cornus florida*	89	7
Sassafras albidum	123	44	0	*Acer saccharum*	38	5
Quercus velutina	14	9	0	*Fagus grandifolia*	29	4
Cornus florida	60	7	4			

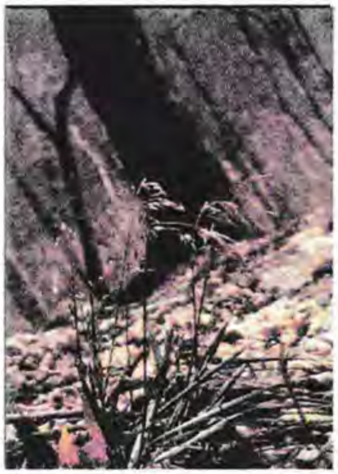
* See page 9-10 for explanation of terms.

MARIETTA
ELTP 23 Dry mesic lower hillslopes/ White oak - Viburnum, Blueberry

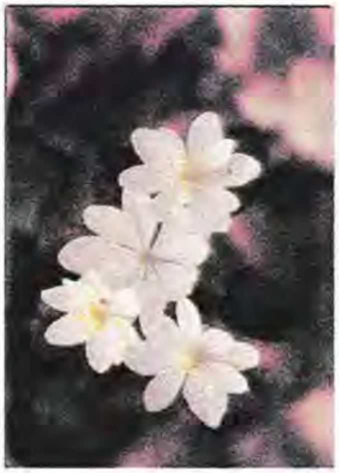
CLASSIFICATION

TREES (canopy): *Quercus alba, Quercus prinus, Quercus velutina, Quercus coccinea, Quercus rubra.*

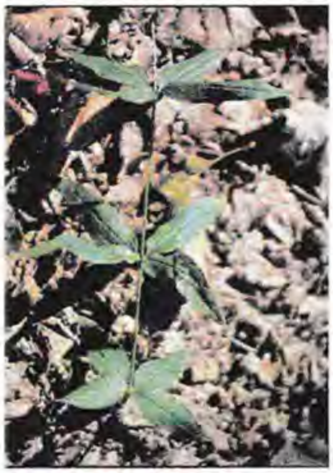
HERBACEOUS: *Lysimachia quadrifolia, Poa cuspidata, Anemonella thalictroides, Galium lanceolatum, Carex rosea*



Poa cuspidata



Anemonella thalictroides



Galium lanceolatum

SOILS:

Horizon	Thickness (cm)	Characteristics
A	6	loam and silt loam
B	24	loam and silt loam
Depth to Mottling	38	

DESCRIPTIVE FEATURES*

WOODY DEBRIS:

	Density	Basal Area	Volume
standing dead wood	25.6 stems/hectare	2.1 m^2/hectare	19.5 m^3/hectare
fallen dead wood	98.9 stems/hectare	3.5 m^2/hectare	26.4 m^3/hectare

Seedlings				Saplings		
Species	Small	Medium	Large	Species	Small	Large
Acer saccharum	45	4	1	*Acer rubrum*	71	1
Acer rubrum	86	9	1	*Cornus florida*	55	1
Liriodendron tulipifera	53	3	0	*Acer saccharum*	40	10
Sassafras albidum	49	11	0	*Fagus grandifolia*	38	4
Fraxinus pennsylvanica	40	12	1			

* See page 9-10 for explanation of terms.

MARIETTA

ELTP 24 Dry mesic lower hillslopes/ White oak - Bluets, Rue anemone

CLASSIFICATION

TREES (canopy): *Quercus alba, Quercus velutina, Liriodendron tulipifera, Quercus rubra, Quercus prinus.*

HERBACEOUS: *Desmodium nudiflorum, Cunila origanoides, Hedyotis caerulea, Antennaria plantaginifolia, Carex gracilescens, Solidago caesia*

Cunila origanoides

Desmodium nudiflorum

SOILS:

Horizon	Thickness (cm)	Characteristics
A	14	loam and silt loam
B	81	clay loams
Depth to Mottling	56	

DESCRIPTIVE FEATURES*

WOODY DEBRIS:

	Density	Basal Area	Volume
standing dead wood	20.0 stems/hectare	1.5 m^2/hectare	12.9 m^3/hectare
fallen dead wood	121.3 stems/hectare	3.6 m^2/hectare	31.2 m^3/hectare

Seedlings				Saplings		
Species	Small	Medium	Large	Species	Small	Large
Acer saccharum	43	9	2	*Cornus florida*	74	2
Acer rubrum	239	35	13	*Acer rubrum*	73	13
Sassafras albidum	181	81	1	*Nyssa sylvatica*	58	4
Quercus prinus	85	13	0	*Fagus grandifolia*	56	5
Quercus alba	57	5	0			

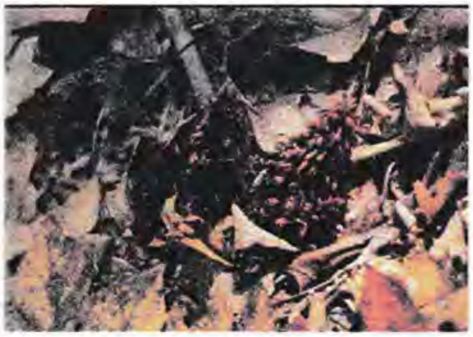
* See page 9-10 for explanation of terms.

MARIETTA
ELTP 31 Dry mesic upper hillslopes/ mixed oaks - Christmas fern

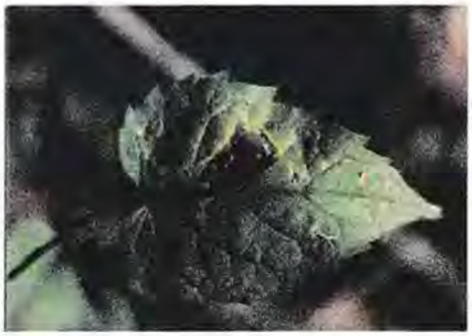
CLASSIFICATION

TREES (canopy): *Quercus prinus, Quercus rubra, Quercus alba, Quercus coccinea, Acer saccharum*

HERBACEOUS: *Conopholis americana, Aster macrophyllus*



Conopholis americana



Aster macrophyllus

SOILS:

Horizon	Thickness (cm)	Characteristics
A	8	loam and silt loams
B	51	clay loams
Depth to Mottling	35	

DESCRIPTIVE FEATURES*

WOODY DEBRIS:

	Density	Basal Area	Volume
standing dead wood	21.7 stems/hectare	2.1 m^2/hectare	14.7 m^3/hectare
fallen dead wood	145.0 stems/hectare	4.1 m^2/hectare	34.0 m^3/hectare

Seedlings				Saplings		
Species	Small	Medium	Large	Species	Small	Large
Acer saccharum	78	2	0	*Asimina triloba*	46	0
Ulmus rubra	38	2	0	*Hamamelis virginiana*	44	3
Fagus grandifolia	13	1	1	*Carpinus caroliniana*	10	1
Fraxinus pennsylvanica	12	2	1	*Acer saccharum*	11	3

* See page 9 & 10 for explanation of terms.

MARIETTA
ELTP 32 Mesic upper hillslopes/ Yellow poplar, Sugar maple - Clearwood, Sweet anise

CLASSIFICATION

TREES (canopy): *Liriodendron tulipifera, Acer saccharum, Fagus grandifolia, Tilia americana, Quercus rubra*

HERBACEOUS: *Smilacina racemosa, Uvularia perfoliata, Osmorhiza claytonii, Arisaema triphyllum, Cimicifuga racemosa, Pilea pumila, Asarum canadense, Dryopteris marginalis, Viola pubescens*

Cimicifuga racemosa

Smilacina racemosa

Osmorhiza claytonii

SOILS:

Horizon	Thickness (cm)	Characteristics
A	15	loam and silt loams
B	66	clay loams
Depth to Mottling	49	

DESCRIPTIVE FEATURES*

WOODY DEBRIS:

	Density	Basal Area	Volume
standing dead wood	26.7 stems/hectare	1.3 m²/hectare	9.1 m³/hectare
fallen dead wood	151.3 stems/hectare	4.6 m²/hectare	32.4 m³/hectare

Seedlings				Saplings		
Species	Small	Medium	Large	Species	Small	Large
Acer saccharum	196	20	2	*Acer saccharum*	133	19
Acer rubrum	154	6	1	*Cornus florida*	49	2
Ulmus rubra	150	44	0	*Acer rubrum*	32	16
Prunus serotina	54	0	1	*Fagus grandifolia*	27	2
Liriodendron tulipifera	47	0	0			

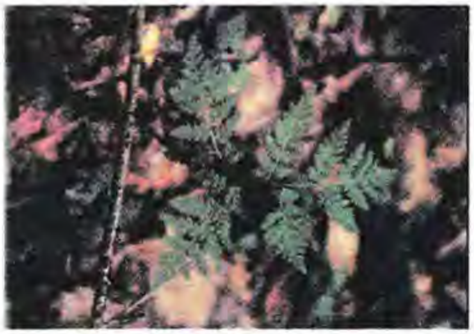
* See page 9 & 10 for explanation of terms.

MARIETTA
ELTP 33 Mesic lower hillslopes/ mixed hardwoods - Spicebush, Aster

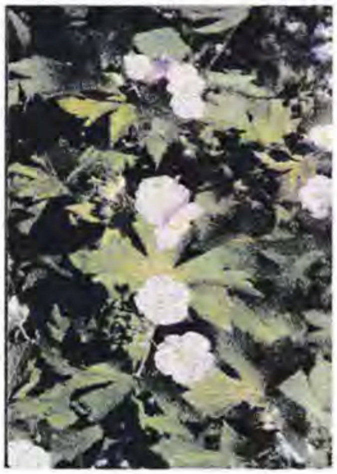
CLASSIFICATION

TREES (canopy): *Quercus alba, Liriodendron tulipifera, Quercus prinus, Quercus rubra, Fagus grandifolia*

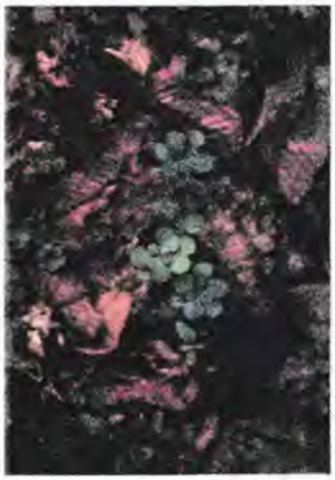
HERBACEOUS: *Botrychium virginianum, Geranium maculatum, Sedum ternatum, Cimicifuga racemosa, Hydrangea arborescens*



Botrychium spp.



Geranium maculatum



Sedum ternatum

SOILS:

Horizon	Thickness (cm)	Characteristics
A	13	loam and silt loams
B	68	clay loams
Depth to Mottling	40	

DESCRIPTIVE FEATURES*

WOODY DEBRIS

	Density	Basal Area	Volume
standing dead wood	32.0 stems/hectare	1.8 m^2/hectare	12.2 m^3/hectare
fallen dead wood	111.0 stems/hectare	3.7 m^2/hectare	33.9 m^3/hectare

Seedlings				Saplings		
Species	Small	Medium	Large	Species	Small	Large
Acer saccharum	229	8	2	*Acer saccharum*	44	9
Ulmus rubra	96	17	0	*Asimina triloba*	23	2
Acer rubrum	32	0	0	*Ulmus americana*	21	7
Prunus serotina	31	2	0	*Fagus grandifolia*	18	1
Liriodendron tulipifera	31	2	0			

* See page 9 & 10 for explanation of terms.

MARIETTA

ELTP 34 Mesic lower hillslopes/ mixed hardwoods - Aster, Honewort

CLASSIFICATION

TREES (canopy): *Liriodendron tulipifera, Acer saccharum, Quercus rubra, Fagus grandifolia, Acer rubrum*

HERBACEOUS: *Lindera benzoin, Osmorhiza claytonii, Sedum ternatum, Cimicifuga racemosa, Pilea pumila*

Lindera benzoin

Sedum ternatum

Pilea pumila

SOILS:

Horizon	Thickness (cm)	Characteristics
A	18	loam and silt loams
B	85	clay loams
Depth to Mottling	67	

DESCRIPTIVE FEATURES*

WOODY DEBRIS

	Density	Basal Area	Volume
standing dead wood	18.7 stems/hectare	1.4 m2/hectare	7.8 m^3//hectare
fallen dead wood	108.0 stems/hectare	4.2 m2/hectare	46.5 m^3//hectare

Seedlings				Saplings		
Species	Small	Medium	Large	Species	Small	Large
Acer rubrum	180	11	4	*Acer saccharum*	87	13
Acer saccharum	156	2	0	*Cornus florida*	53	2
Quercus prinus	64	0	0	*Acer rubrum*	43	9
Fraxinus pennsylvanica	57	9	0	*Ostiya virginiana*	17	0
Cornus florida	54	6	0			

* See page 9 & 10 for explanation of terms.

4.2 Athens/Ironton ELTPs

Topographic Features of ELTs:

1 - Uplands	3 - Mesic Northerly Aspects
2 - Dry Southerly Aspects	4 - Bottomlands

To key out an ELTP, the appropriate ELT designator is found first. This serves as the first digit in the ELTP. After determining the first digit, the second and third digits are based on other characteristics described below.

ELTPs

UPLANDS

110 - Infertile Uplands, more southerly
120 - Fertile Uplands, more northerly

SOUTHERLY

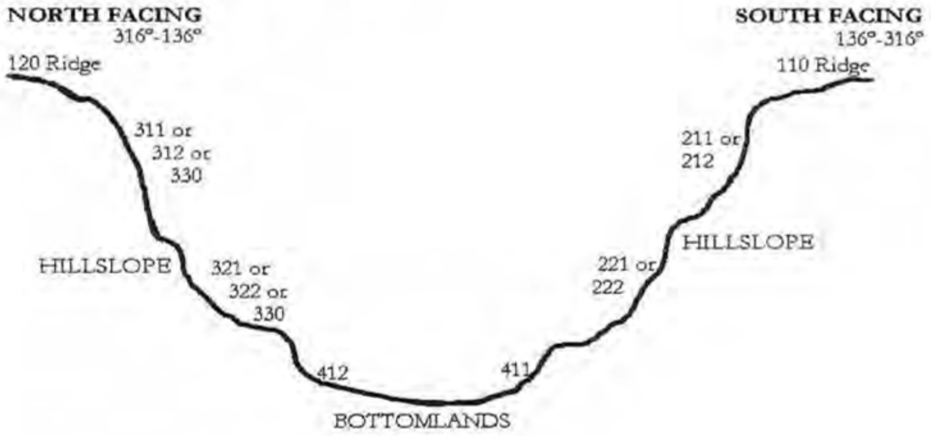
211 - Dry-Xeric upper hillslopes, > 30 % slope
212 - Dry- Xeric upper hillslopes, < 30% slope
221 - Dry Mesic lower hillslopes, > 35% slope
222 - Dry Mesic lower hillslopes, > 35% slope
230 - Dry-moderately fertile hillslopes

NORTHERLY

311 - Mesic-dry upper hillslopes, < 35% slope
312 - Mesic dry upper hillslopes, > 35% slope
321 - Mesic lower hillslopes, < 35% slope
322 - Mesic lower hillslopes, > 35% slope
330 - Very fertile mesic, northerly hillslopes

BOTTOMLANDS

441 - Less fertile bottomlands, southerly
412 - Very fertile bottomlands, northerly


NORTH FACING
316°-136°
120 Ridge
311 or
312 or
330
HILLSLOPE
321 or
322 or
330
412
BOTTOMLANDS
411
221 or
222
HILLSLOPE
211 or
212
110 Ridge
SOUTH FACING
136°-316°

ECOLOGICAL LANDTYPES ON THE ATHENS AND IRONTON UNITS:

ATHENS / IRONTON
ELTP 110 Infertile Uplands / Scarlet Oak, Chestnut Oak - Blueberry

CLASSIFICATION

TREES (canopy): *Quercus coccinea, Quercus prinus, Quercus velutina, Pinus* spp

HERBACEOUS: *Vaccinium pallidum, Chimaphila maculata, Vaccinium stamineum*

Vaccinium pallidum

Chimaphila maculata

Vaccinium stamineum

SOILS:

Horizon	Thickness (cm)	Characteristics
A	4	loam and silt loams
B	55	clay loams
Depth to Mottling	59	

DESCRIPTIVE FEATURES*

WOODY DEBRIS:

	Density	Basal Area	Volume
standing dead wood	54.0 stems/hectare	2.6 m2/hectare	20.2 m^3//hectare
fallen dead wood	124.0 stems/hectar	5.2 m2/hectare	36.9 m^3//hectare

Seedlings				Saplings		
Species	Small	Medium	Large	Species	Small	Large
Acer rubrum	273	45	6	*Acer rubrum*	141	13
Cornus florida	25	8	1	*Cornus florida*	83	9
Quercus alba	27	4	0	*Fagus grandifolia*	25	0
Quercus prinus	62	6	0	*Nyssa sylvatica*	11	2
Sassafras albidum	493	141	1			

* See page 9 & 10 for explanation of terms.

ATHENS/IRONTON
ELTP 120 Fertile Uplands / Shagbark hickory, Pignut hickory - Smooth Solomons seal, Pokeweed

CLASSIFICATION

TREES (canopy): *Carya ovata, Carya glabra, Quercus velutina, Quercus alba*

HERBACEOUS: *Polygonatum biflorum, Phytolacca americana, Sanguinaria canadensis, Veronica officinalis*

Polygonatum biflorum

Sanguinaria canadensis

SOILS:

Horizon	Thickness (cm)	Characteristics
A	7	loam and silt loams
B	73	clay loams
Depth to Mottling	52	

DESCRIPTIVE FEATURES*

WOODY DEBRIS:

	Density	Basal Area	Volume
standing dead wood	26.7 stems/hectare	1.6 m²/hectare	14.5 m³/hectare
fallen dead wood	109.6 stems/hectare	3.8 m²/hectare	25.7 m³/hectare

Seedlings				Saplings		
Species	Small	Medium	Large	Species	Small	Large
Acer rubrum	374	33	3	*Cornus florida*	140	13
Cornus florida	239	57	3	*Acer rubrum*	71	5
Sassafras albidum	329	45	3	*Acer saccharum*	19	10
Ulmus rubra	168	22	0	*Ostrya virginiana*	14	5
Prunus serotina	162	20	0			

* See page 9 & 10 for explanation of terms.

ATHENS/IRONTON
ELTP 211 Southerly Dry-Upper Hillslopes (>30%)/ Chestnut oak, Scarlet oak - False foxglove, Poverty grass

CLASSIFICATION

TREES (canopy): *Quercus prinus, Quercus coccinea, Quercus alba*

HERBACEOUS: *Aureolaria flava, Danthonia spicata, Panicum dichotomiflorum, Vaccinium pallidum, Vaccinium stamineum, Hedyotis longifolia*

Danthonia spicata

Vaccinium stamineum

Vaccinium pallidum

SOILS:

Horizon	Thickness (cm)	Characteristics
A	6	loam and silt loams
B	58	clay loams
Depth to Mottling	65	

DESCRIPTIVE FEATURES*

WOODY DEBRIS:

	Density	Basal Area	Volume
standing dead wood	41.8 stems/hectare	1.9 m^2/hectare	11.2 m^3/hectare
fallen dead wood	134.5 stems/hectare	3.8 m^2/hectare	27.6 m^3/hectare

Seedlings				Saplings		
Species	Small	Medium	Large	Species	Small	Large
Acer rubrum	463	37	7	*Acer rubrum*	86	19
Sassafras albidum	338	108	3	*Quercus prinus*	62	2
Quercus prinus	174	44	2	*Cornus florida*	45	5
Fraxinus pennsylvanica	171	8	0	*Acer saccharum*	20	12
Quercus alba	148	3	0	*Nyssa sylvatica*	34	13

* See page 9 & 10 for explanation of terms.

ATHENS/IRONTON

ELTP 212 Southerly Dry-Upper Hillslopes (<30%)/ Red maple, Red oak, White oak - Wild yellow lily, Sedge

CLASSIFICATION

TREES (canopy): *Acer rubrum, Quercus velutina, Quercus alba, Carya* spp.

HERBACEOUS: *Lilium canadense, Carex digitalis, Bromus pubescens*

SOILS:

Horizon	Thickness (cm)	Characteristics
A	8	loam and silt loams
B	81	clay loams
Depth to Mottling	66	

DESCRIPTIVE FEATURES

WOODY DEBRIS:

	Density	Basal Area	Volume
standing dead wood	53.3 stems/hectare	3.0 m²/hectare	22.9 m³/hectare
fallen dead wood	124.2 stems/hectare	3.7 m²/hectare	28.1 m³/hectare

Seedlings				Saplings		
Species	Small	Medium	Large	Species	Small	Large
Acer rubrum	815	71	10	*Cornus florida*	242	38
Sassafras albidum	407	96	1	*Acer saccharum*	24	12
Cornus florida	325	64	15	*Acer rubrum*	70	12
Quercus alba	291	18	1	*Carya ovata*	4	8
Ulmus rubra	337	34	0	*Carya glabra*	5	7

* See page 9 & 10 for explanation of terms.

ATHENS/IRONTON

ELTP 221 Southerly Dry - Mesic Lower Hillslopes (<30%)/ Scarlet oak, Chestnut oak, White oak - Whorled loosestrife

CLASSIFICATION

TREES (canopy): *Quercus coccinea, Quercus prinus, Quercus alba*

HERBACEOUS: *Lysimachia quadrifolia, Krigia biflora, Vaccinium stamineum, Carex digitalis, Carex willdenowii, Goodyera pubescens*

Vaccinium stamineum

Goodyera pubescens

SOILS:

Horizon	Thickness (cm)	Characteristics
A	5.6	loam and silt loams
B	87.5	clay loams
Depth to Mottling	65	

DESCRIPTIVE FEATURES

WOODY DEBRIS:

	Density	Basal Area	Volume
standing dead wood	40.9 stems/hectare	1.6 m^2/hectare	10.6 m^3/hectare
fallen dead wood	110.0 stems/hectare	3.5 m^2/hectare	23.1 m^3/hectare

Seedlings				Saplings		
Species	Small	Medium	Large	Species	Small	Large
Acer rubrum	683	53	6	*Acer rubrum*	142	24
Sassafras albidum	633	237	3	*Nyssa sylvatica*	34	8
Quercus alba	203	17	1	*Cornus florida*	65	6
Acer saccharum	136	27	1	*Acer saccharum*	29	6
Amelanchier arborea	109	18	0	*Carya glabra*	12	5

* See page 9 & 10 for explanation of terms.

ATHENS/IRONTON

ELTP 222 Southerly Dry - Mesic Lower Hillslopes (>30%)/ White oak, Black Cherry, Red maple - Bluegrass, Sedge

CLASSIFICATION

TREES (canopy): *Quercus alba, Prunus serotina, Acer rubrum*

HERBACEOUS: *Poa cuspidata, Carex gracilescens, Carex laxiflora, Epifagus virginiana*

Poa cuspidata

Epifagus virginiana

SOILS:

Horizon	Thickness (cm)	Characteristics
A	8.7	loam and silt loams
B	39.3	clay loams
Depth to Mottling	65	

DESCRIPTIVE FEATURES

WOODY DEBRIS:

	Density	Basal Area	Volume
standing dead wood	48.3 stems/hectare	1.8 m^2/hectare	12.5 m^3/hectare
fallen dead wood	120.0 stems/hectare	2.5 m^2/hectare	12.1 m^3/hectare

Seedlings				Saplings		
Species	Small	Medium	Large	Species	Small	Large
Quercus alba	170	0	0	*Acer saccharum*	12	6
Acer rubrum	147	15	4	*Cornus florida*	29	6
Ulmus rubra	108	1	0	*Acer rubrum*	40	6
Sassafras albidum	87	22	1	*Fagus grandifolia*	36	5
Cornus florida	24	8	1			

* See page 9 & 10 for explanation of terms.

ATHENS/IRONTON

ELTP 230 Dry - Moderately Fertile Hillslopes / White oak, Black oak, Sugar maple, Red oak - Indian pipe, Panic grass

CLASSIFICATION

TREES (canopy): *Quercus alba, Quercus velutina, Acer saccharum, Quercus rubra*

HERBACEOUS: *Monotropa uniflora, Panicum boscii, Galium concinnum, Viburnum prunifolium*

Galium concinnum

Viburnum prunifolium

SOILS:

Horizon	Thickness (cm)	Characteristics
A	7.8	loam and silt loams
B	70	clay loams
Depth to Mottling	56	

DESCRIPTIVE FEATURES

WOODY DEBRIS:

	Density	Basal Area	Volume
standing dead wood	15.6 stems/hectare	1.1 m^2/hectare	10.3 m^3/hectare
fallen dead wood	73.3 stems/hectare	2.2 m^2/hectare	14.4 m^3/hectare

Seedlings				Saplings		
Species	Small	Medium	Large	Species	Small	Large
Acer rubrum	258	11	0	*Acer saccharum*	106	24
Sassafras albidum	195	37	0	*Acer rubrum*	29	10
Quercus alba	637	0	0	*Ostrya virginiana*	45	6
Cornus florida	116	48	3	*Fraxinus pennsylvanica*	7	4
Ostrya virginiana	100	29	4			

* See page 9 & 10 for explanation of terms.

ATHENS/IRONTON

ELTP 311 Northerly Mesic - Dry Upper Hillslopes (>35%) / White oak, Black oak, Black Gum

CLASSIFICATION

TREES (canopy): *Quercus alba, Quercus velutina, Nyssa sylvatica*

HERBACEOUS: Unclear

SOILS:

Horizon	Thickness (cm)	Characteristics
A	11.3	loam and silt loams
B	96.3	clay loams
Depth to Mottling	70	

DESCRIPTIVE FEATURES

WOODY DEBRIS:

	Density	Basal Area	Volume
standing dead wood	29.2 stems/hectare	1.8 m²/hectare	15.3 m³/hectare
fallen dead wood	156.7 stems/hectare	5.4 m²/hectare	41.4 m³/hectare

Seedlings				Saplings		
Species	Small	Medium	Large	Species	Small	Large
Acer rubrum	360	21	4	*Cornus florida*	3	20
Ulmus rubra	217	5	0	*Acer rubrum*	69	20
Acer saccharum	184	43	0	*Acer saccharum*	22	15
Cornus florida	174	35	6	*Cercis canadensis*	17	2
Fraxinus pennsylvanica	88	30	4			

* See page 9 & 10 for explanation of terms.

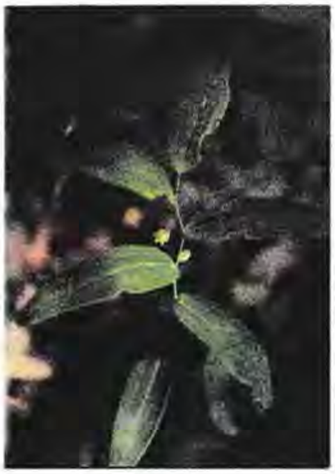
ATHENS/IRONTON

ELTP 312 Northerly Mesic - Dry Upper Hillslopes (>35%) / Red oak, Sugar maple, American beech - Hairy Solomons seal, Wild licorice

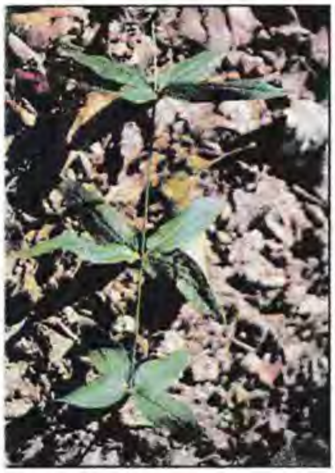
CLASSIFICATION

TREES (canopy): *Quercus rubra, Acer saccharum, Fagus grandifolia*

HERBACEOUS: *Polygonatum pubescens, Galium lanceolatum, Athyrium pycnocarpon*



Polygonatum pubescens



Galium lanceolatum

SOILS:

Horizon	Thickness (cm)	Characteristics
A	10.2	loam and silt loams
B	57.3	clay loams
Depth to Mottling	71	

DESCRIPTIVE FEATURES

WOODY DEBRIS:

	Density	Basal Area	Volume
standing dead wood	31.1 stems/hectare	3.5 m^2/hectare	30.3 m^3/hectare
fallen dead wood	161.1 stems/hectare	6.9 m^2/hectare	53.3 m^3/hectare

Seedlings				Saplings		
Species	Small	Medium	Large	Species	Small	Large
Ulmus rubra	645	29	0	*Acer rubrum*	16	2
Acer saccharum	447	63	3	*Acer saccharum*	145	37
Acer rubrum	426	24	4	*Cornus florida*	20	3
Fraxinus pennsylvanica	204	41	5	*Ulmus rubra*	36	1
Prunus serotina	109	5	0			

* See page 9 &10 for explanation of terms.

ATHENS/IRONTON

ELTP 321 Northerly Mesic - Lower Hillslopes (<35%) / White oak, Black oak, Hickories - Tick trefoil, Bloodroot

CLASSIFICATION

TREES (canopy): *Quercus alba, Quercus velutina, Carya glabra, Carya ovata, Aesculus octandra*

HERBACEOUS: *Desmodium glutinosum, Sanicula canadensis, Viola pubescens, Brachyelytrum erectum, Galium concinnum, Hepatica americana, Thelypteris hexagonoptera*

Sanicula canadensis

Brachyelytrum erectum

Galium concinnum

SOILS:

Horizon	Thickness (cm)	Characteristics
A	11.5	loam and silt loams
B	78.6	clay loams
Depth to Mottling	79	

DESCRIPTIVE FEATURES

WOODY DEBRIS:

	Density	Basal Area	Volume
standing dead wood	33.1 stems/hectare	2.1 m²/hectare	18.1 m³/hectare
fallen dead wood	123.8 stems/hectare	4.5 m²/hectare	35.1 m³/hectare

Seedlings				Saplings		
Species	Small	Medium	Large	Species	Small	Large
Ulmus rubra	586	28	1	*Acer saccharum*	126	27
Fraxinus pennsylvanica	401	58	3	*Ostrya virginiana*	46	9
Acer rubrum	389	42	2	*Acer rubrum*	63	7
Quercus alba	218	1	0	*Carpinus caroliniana*	19	5
Acer saccharum	215	85	5			

* See page 9 & 10 for explanation of terms.

ATHENS/IRONTON

ELTP 322 Northerly Mesic - Lower Hillslopes (>35%) / Red oak, Sugar Maple, American Beech - Skullcap, Sedge

CLASSIFICATION

TREES (canopy): *Quercus rubra, Acer saccharum, Fagus grandiflora*

HERBACEOUS: *Scutellaria elliptica, Carex gracilescens, Galium aparine, Galium triflorum, Adiantum pedatum*

Adiantum pedatum

Galium aparine

Galium triflorum

SOILS:

Horizon	Thickness (cm)	Characteristics
A	13.2	loam and silt loams
B	67.5	clay loams
Depth to Mottling	77	

DESCRIPTIVE FEATURES

WOODY DEBRIS:

	Density	Basal Area	Volume
standing dead wood	18.3 stems/hectare	0.7 m²/hectare	6.0 m³/hectare
fallen dead wood	98.3 stems/hectare	2.2 m²/hectare	13.8 m³/hectare

Seedlings				Saplings		
Species	Small	Medium	Large	Species	Small	Large
Acer saccharum	177	7	2	*Acer saccharum*	64	22
Ulmus rubra	143	22	0	*Ostrya virginiana*	17	5
Fraxinus pennsylvanica	105	9	1	*Acer rubrum*	5	4
Quercus alba	67	0	0	*Cornus florida*	8	2
Acer rubrum	54	3	0			

* See page 9 & 10 for explanation of terms.

ATHENS/IRONTON
ELTP 330 Northerly Very Fertile Mesic Hillslopes / White oak, Red oak, Ash - Bloodroot, White Avens

CLASSIFICATION

TREES (canopy): *Quercus alba, Quercus rubra, Acer saccharum, Fraxinus* spp.

HERBACEOUS: *Sanguinaria canadensis, Geum canadense, Euonymus atropurpureus, Staphylea trifolia, Impatiens capensis, Urtica dioica*

Sanguinaria canadensis

Impatiens capensis

SOILS:

Horizon	Thickness (cm)	Characteristics
A	14.4	loam and silt loams
B	84	clay loams
Depth to Mottling	66	

DESCRIPTIVE FEATURES*

WOODY DEBRIS:

	Density	Basal Area	Volume
standing dead wood	26.0 stems/hectare	1.3 m²/hectare	5.9 m³/hectare
fallen dead wood	122.0 stems/hectare	4.2 m²/hectare	33.4 m³/hectare

Seedlings				Saplings		
Species	Small	Medium	Large	Species	Small	Large
Ulmus rubra	407	20	2	*Acer saccharum*	129	16
Fraxinus pennsylvanica	176	22	0	*Acer rubrum*	3	9
Acer saccharum	117	28	2	*Ostrya virginiana*	26	5
Cornus florida	107	16	0	*Fagus grandifolia*	24	5
Quercus alba	91	0	0			

* See page 9 & 10 for explanation of terms.

ATHENS/IRONTON

ELTP 411 Bottomlands - Less Fertile, Southerly Aspect / White oak, Yellow poplar, Blue beech, Sugar maple - Heart-leaved groundsel, Greenbrier

CLASSIFICATION

TREES (canopy): *Quercus alba, Liriodendron tulipifera, Carpinus caroliniana, Acer saccharum*

HERBACEOUS: *Senecio aureus, Smilax ecirrhata, Viburnum dentatum, Dioscorea quaternata*

Senecio aureus

Dioscorea quaternata

SOILS:

Horizon	Thickness (cm)	Characteristics
A	12.4	loam and silt loams
B	89	clay loams
Depth to Mottling	60	

DESCRIPTIVE FEATURES*

WOODY DEBRIS:

	Density	Basal Area	Volume
standing dead wood	32.0 stems/hectare	2.1 m^2/hectare	13.6 m^3/hectare
fallen dead wood	188.0 stems/hectare	5.8 m^2/hectare	46.8 m^3/hectare

Seedlings				Saplings		
Species	Small	Medium	Large	Species	Small	Large
Quercus alba	109	2	0	*Acer saccharum*	42	11
Ulmus rubra	108	69	4	*Acer rubrum*	10	5
Fraxinus pennsylvanica	80	9	1	*Ostrya virginiana*	118	5
Acer rubrum	57	4	0	*Fagus grandifolia*	15	3
Liriodendron tulipifera	39	3	0			

* See page 9 & 10 for explanation of terms.

ATHENS/IRONTON

ELTP 412 Bottomlands - Very Fertile, Northerly Aspect / White oak, Green ash, Yellow buckeye, American beech, Basswood, Sycamore - Basil bee balm, Jumpseed

CLASSIFICATION

TREES (canopy): *Quercus alba, Fraxinus Pennsylvanica, Aesculus octandra, Fagus grandifolia, Tilia americana, Platanus occidentalis*

HERBACEOUS: *Monarda clinopodia, Polygonum virginianum, Sanicula marilandica, Sedum ternatum, Verbesina alternifolia, Viola striata*

Monarda clinopodia

Verbesina alternifolia

Polygonum virginianum

SOILS:

Horizon	Thickness (cm)	Characteristics
A	20.2	loam and silt loams
B	59.3	clay loams
Depth to Mottling	61	

DESCRIPTIVE FEATURES*

WOODY DEBRIS:

	Density	Basal Area	Volume
standing dead wood	18.3 stems/hectare	1.1 m²/hectare	11.3 m³/hectare
fallen dead wood	173.3 stems/hectare	4.8 m²/hectare	42.5 m³/hectare

Seedlings				Saplings		
Species	Small	Medium	Large	Species	Small	Large
Fraxinus pennsylvanica	120	12	1	*Acer saccharum*	52	10
Acer rubrum	44	0	0	*Ulmus rubra*	38	5
Ulmus rubra	35	4	1	*Tilia americana*	2	4
Acer saccharum	19	6	1	*Aesculus octandra*	16	4

* See page 9 & 10 for explanation of terms.

5.0 References

5.1 Glossary

Basal Area - Meter square per hectare (m^2/H)

Density - Number of stems per hectare (#/H)

Edaphic- pertaining to the chemical and physical characteristics of the soil without reference to climate.

Fallen dead wood - Fallen logs with a minimum mid-diameter >10 cm, includes those fallen to the forest floor recently and those which were solid, solid-decayed, or well decayed.

Geomorphology- the science dealing with the nature and origin of the earths topographic features; landforms.

Landforms- study of the classification, description, nature, origin and development of landform; features that make up the surface of the earth. Includes broad features such as: plains, plateaus, and mountains; also minor features such as: hills, valleys, slopes, canyons, arroyos, and alluvial fans.

Mesic - habitats which are moderately moist.

Physiognomy - "external aspect"; structural characteristics of a plant community.

Physiography - description of the features and phenomena of nature. See geomorphology and physical geography as well.

Physical Geography - Study of the features and nature of the earths solid surface, oceans, atmosphere and climate and the distribution of plants.

Seedlings - measured within eight 2-meter square subplots
Small Seedlings = number of woody seedlings < 30 cm tall
Medium Seedlings = number of woody seedlings > or = 30 cm and < 90 cm tall
Large Seedlings = number of woody seedlings > 90 cm

Saplings - measured with 100-meter square subplots
Small Saplings = number of woody stems > 1.37m tall and < 5.0 cm dbh
Large Saplings = number of woody stems > 1.37m tall and > or = to 5.0 cm & < 10.0 cm dbh

Spatially - existing or occurring in space.

Standing dead wood - Snags or dead trees > 10.0 cm diameter breast height.

Volume - Meter cubed per hectare (m^3/H)

Xeric - habitats which are dry or which dry out quickly due to exposure of sun.

5.2 References & Bibliography

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5.3 Common Names for Latin Names

Scientific Name	Common Name
Acer rubrum	Red Maple
Acer saccharum	Sugar Maple
Adiantum pedatum	Maidenhair Fern
Aesculus octandra	Yellow Buckeye
Amelanchier arborea	Serviceberry
Anemonella thalictroides	Rue Anemone
Antennaria plantaginifolia	Pussy Toes
Arisaema triphyllum	Jack-in-the-Pulpit
Asarum canadense	Wild Ginger
Asimina triloba	Pawpaw
Aspelnium platyneuron	Ebony Spleenwort
Aster macrophyllus	Big Leaved Aster
Athyrium pycnocarpon	Narrow Leaved Spleenwort
Aureolaria flava	Smooth False Foxglove
Botrychium virginianum	Rattlesnake Fern
Brachyelytrum erectum	Grass
Bromus pubescens	Brome Grass
Carex digitalis	Sedge
Carex gracilescens	Sedge
Carex laxiflora	Sedge
Carex rosea	Sedge
Carex willdenowii	Sedge
Carpinus caroliniana	Blue Beech
Carya glabra	Pignut Hickory
Carya ovata	False Pignut Hickory
Cercis canadensis	Redbud
Chimaphila maculata	Spotted Wintergreen
Cimicifuga racemosa	Black Cohosh
Cornus florida	Dogwood
Conopholis americana	Squawroot
Cryptotaenia canadensis	Honewort
Cunila origanoides	Wild Oregano
Danthonia spicata	Poverty Grass
Desmodium glutinosum	Cluster Leaf Tick Trefoil
Desmodium nudiflorum	Tick Trefoil
Dioscorea quaternata	Whorled Yam
Dryopteris marginalis	Marginal Wood Fern
Epifagus virginiana	Beech Drops
Euonymus atropurpureus	Wahoo
Fagus grandifolia	American Beech
Fraxinus americana	White Ash
Fraxinus pennsylvanica	Green Ash
Galium aparine	Cleavers
Galium circaezans	Forest Bedstraw
Galium concinnum	Shining Bedstraw
Galium lanceolatum	Wild Licorice
Galium triflorum	Sweet Scented Bedstraw
Geranium maculatum	Wild Geranium

Scientific Name	**Common Name**
Geum canadense	White Avens
Goodyera pubescens	Downy Rattlesnake Plantain
Hedyotis caerulea	Bluets
Hedyotis longifolia	Long Leaf bluets
Hepatica americana	Common Alum Root
Hydrangea arborescens	Wild Hydrangea
Impatiens capensis	Orange Jewelweed
Kalmia latifolia	Mountain Laurel
Krigia bilfora	Orange Dwarf Dandelion
Laportea canadensis	Wood Nettle
Lilium canadense	Wild Yellow Lilly
Lindera Benzoin	Spicebush
Liriodendron tulipifera	Yellow Poplar
Lyusimachia quadrifolia	Whorled Loosestrife
Monarda clinopodia	Basil Bee Balm
Monotropa uniflora	Indian Pipe
Nyssa sylvatica	Black Gum
Osmorhiza claytonni	Long Styled Sweet Anise
Ostrya virginiana	Eastern Hophornbeam
Panicum boscii	Panic Grass
Panicum dichotomiflorum	Panic Grass
Phlox divaricata	Woodland Phlox
Phytolacca americana	Pokeweed
Pilea pumila	Clearweed
Pinus rigida	Pitch Pine
Pinus virginiana	Virginia Pine
Platanus occidentalis	Sycamore
Poa cuspidata	Bluegrass
Podophyllum peltatum	May Apple
Polygonatum biflorum	Smooth Solomon's Seal
Polygonatum pubescens	Hairy Solomon's Seal
Polygonum virginianum	Jumpseed
Prunus serotina	Black Cherry
Quercus alba	White Oak
Quercus coccinea	Scarlet Oak
Quercus prinus	Chestnut Oak
Quercus rubra	Red Oak
Quercus velutina	Black Oak
Rosa carolina	Carolina Rose
Sanicula canadensis	Black Snakeroot
Sanicula marilandica	Sanicle
Sassafras albidum	Sassafras
Scutellaria elliptic	Hairy Skullcap
Sedum ternatum	Stonecrop
Senecio aureus	Heart Leaved Groundsel
Smilacina racemosa	False Solomon's Seal
Smilax ecirrata	Greenbrier
Smilax glauca	Sawbriar
Solidago caesia	Blue-stem Goldenrod
Staphylea trifolia	Bladdernut

Scientific Name	**Common Name**
Thelypteris hexagonoptera	Broad Beech Fern
Tilia americana	Beechwood
Tsuga canadensis	Eastern Hemlock
Urtica dioica	Stinging Nettle
Ulmus rubra	Slippery Elm
Uvularia perfoliata	Bellwort
Vaccinium pallidum	Hillside Blueberry
Vaccinium stamineum	Deerberry
Verbesina alternifolia	Wingstem
Veronica officinalis	Common Speedwell
Viburnum prunifolium	Cherry Leaf Viburnum
Viburnum dentatum	Arrow Wood
Viola pubescens	Yellow Forest Violet
Viola striata	Creamy Violet

5.4 Latin Names for Common Names [Illustrated beginning page 52]

Common Name	**Scientific Name**
American Beech	*Fagus grandifolia*
Arrow Wood	*Viburnum dentatum*
Basil Bee Balm	*Monarda clinopodia*
Beech Drops	*Epifagus virginiana*
Beechwood	*Tilia americana*
Bellwort	*Uvularia perfoliata*
Big Leaved Aster	*Aster macrophyllus*
Black Cherry	*Prunus serotina*
Black Cohosh	*Cimicifuga racemosa*
Black Gum	*Nyssa sylvatica*
Black Oak	*Quercus velutina*
Black Snakeroot	*Sanicula canadensis*
Bladdernut	*Staphylea trifolia*
Blue Beech	*Carpinus caroliniana*
Blue-stem Goldenrod	*Solidago caesia*
Bluegrass	*Poa cuspidata*
Bluets	*Hedyotis caerulea*
Broad Beech Fern	*Thelypteris hexagonoptera*
Brome Grass	*Bromus pubescens*
Carolina Rose	*Rosa carolina*
Cherry Leaf Viburnum	*Viburnum prunifolium*
Chestnut Oak	*Quercus prinus*
Clearweed	*Pilea pumila*
Cleavers	*Galium aparine*
Cluster Leaf Tick Trefoil	*Desmodium glutinosum*
Common Alum Root	*Hepatica americana*
Common Speedwell	*Veronica officinalis*
Creamy Violet	*Viola striata*

Common Name	Scientific Name
Deerberry	*Vaccinium stamineum*
Dogwood	*Cornus florida*
Downy Rattlesnake Plantain	*Goodyera pubescens*
Eastern Hemlock	*Tsuga canadensis*
Eastern Hophornbeam	*Ostrya virginiana*
Ebony Spleenwort	*Asplenium platyneuron*
False Solomon's Seal	*Smilacina racemosa*
Forest Bedstraw	*Galium circaezans*
Grass	*Brachyelytrum erectum*
Green Ash	*Fraxinus pennsylvanica*
Greenbriar	*Smilax ecirrata*
Hairy Skullcap	*Scutellaria eliptica*
Hairy Solomon's Seal	*Polygonatum pubescens*
Heart Leaved Groundsel	*Senecio aureus*
Hillside Blueberry	*Vaccinium pallidum*
Honewort	*Cryptotaenia canadensis*
Indian Pipe	*Monotropa uniflora*
Jack-in-the-Pulpit	*Arisaema triphyllum*
Jumpseed	*Polygonum virginianum*
Long Leaf bluets	*Hedyotis longifolia*
Long Styled Sweet Anise	*Osmorhiza claytonni*
Maidenhair Fern	*Adiantum pedatum*
Marginal Wood Fern	*Dryopteris marginalis*
May Apple	*Podophyllum peltatum*
Mountain Laurel	*Kalmia latifolia*
Narrow Leaved Spleenwort	*Athyrium pycnocarpon*
Orange Dwarf Dandelion	*Krigia bilfora*
Orange Jewelweed	*Impatiens capensis*
Panic Grass	*Panicum boscii*
Panic Grass	*Panicum dichotomiflorum*
Pawpaw	*Asimina triloba*
Pignut Hickory	*Carya glabra*
Pitch Pine	*Pinus rigida*
Pokeweed	*Phytolacca americana*
Poverty Grass	*Danthonia spicata*
Pussy Toes	*Antennaria plantaginifolia*
Rattlesnake Fern	*Botrychium virginianum*
Red Maple	*Acer rubrum*
Red Oak	*Quercus rubra*
Redbud	*Cercis canadensis*
Rue Anemone	*Anemonella thalictroides*
Sanicle	*Sanicula marilandica*
Sassafras	*Sassafras albidum*
Sawbriar	*Smilax glauca*
Scarlet Oak	*Quercus coccinea*
Sedge	*Carex digitalis*
Sedge	*Carex gracilescens*
Sedge	*Carex laxiflora*
Sedge	*Carex rosea*
Sedge	*Carex willdenowii*

Common Name	**Scientific Name**
Serviceberry	*Amelanchier arborea*
Shagbark Hickory	*Carya ovata*
Shining Bedstraw	*Galium concinnum*
Slippery Elm	*Ulmus rubra*
Smooth False Foxglove	*Aureolaria flava*
Smooth Solomon's Seal	*Polygonatum biflorum*
Spicebush	*Lindera benzoin*
Spotted Wintergreen	*Chimaphila maculata*
Squawroot	*Conopholis americana*
Stinging Nettle	*Urtica dioica*
Stonecrop	*Sedum ternatum*
Sugar Maple	*Acer saccharum*
Sweet Scented Bedstraw	*Galium triflorum*
Sycamore	*Platanus occidentalis*
Tick Trefoil	*Desmodium nudiflorum*
Virginia Pine	*Pinus virginiana*
Wahoo	*Euonymus atropurpureus*
White Ash	*Fraxinus americana*
White Avens	*Geum canadense*
White Oak	*Quercus alba*
Whorled Loosestrife	*Lysimachia quadrifolia*
Whorled Yam	*Dioscorea quaternata*
Wild Geranium	*Geranium maculatum*
Wild Ginger	*Asarum canadense*
Wild Hydrangea	*Hydrangea arborescens*
Wild Licorice	*Galium lanceolatum*
Wild Oregano	*Cunila origanoides*
Wild Yellow Lilly	*Lilium canadense*
Wingstem	*Verbesina alternifolia*
Wood Nettle	*Laportea canadensis*
Woodland Phlox	*Phlox divaricata*
Yellow Buckeye	*Aesculus octandra*
Yellow Forest Violet	*Viola pubescens*
Yellow Poplar	*Liriodendron tulipifera*

5.5 National Hierarchy of Ecological Units

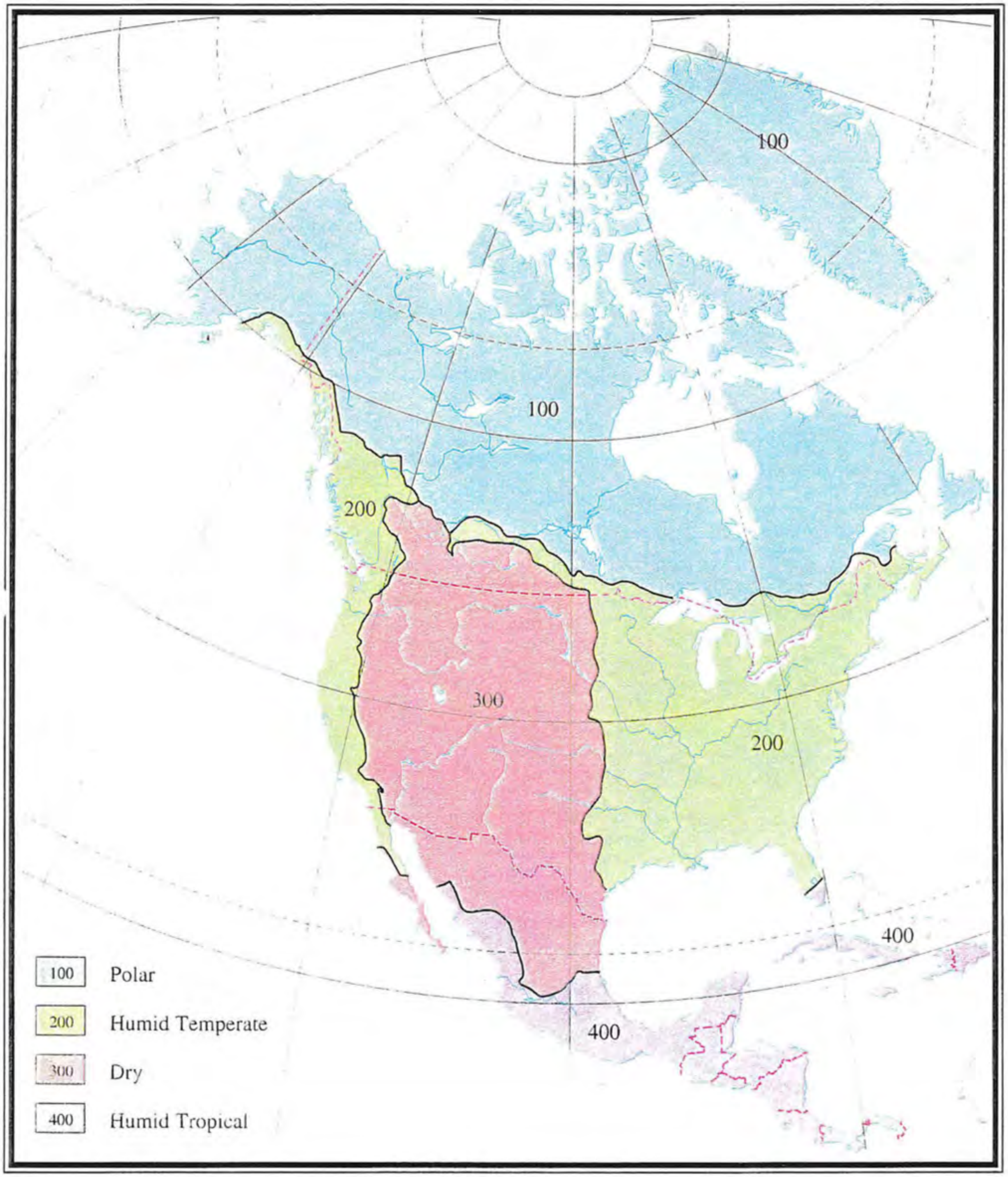
Planning and Analysis Scale	Ecological Units	Delineating Criteria	Scale/Polygon Size
ECOREGION	Domain/ Division/ Province	Global and continental climate and gross physiography	1,000,000's - 10,000's square miles
SUBREGION	Section/ Subsection	Regional climate modified by geology (province) and landform	1,000's - 10's square miles
LANDSCAPE	Landtype Association	Landform, geology (process and Lithology), soil complexes	1,000's - 100's acres
LAND UNIT	Landtype Landtype Phase	Interactions of local topography, water, soils, and vegetation	100's - <10 acres

(adapted from Avers et al. 1993)

The following pages detail the ecological units within the Ecoregion and Subregions listed above.

Ecoregion DOMAINS of North America

First division within Ecoregions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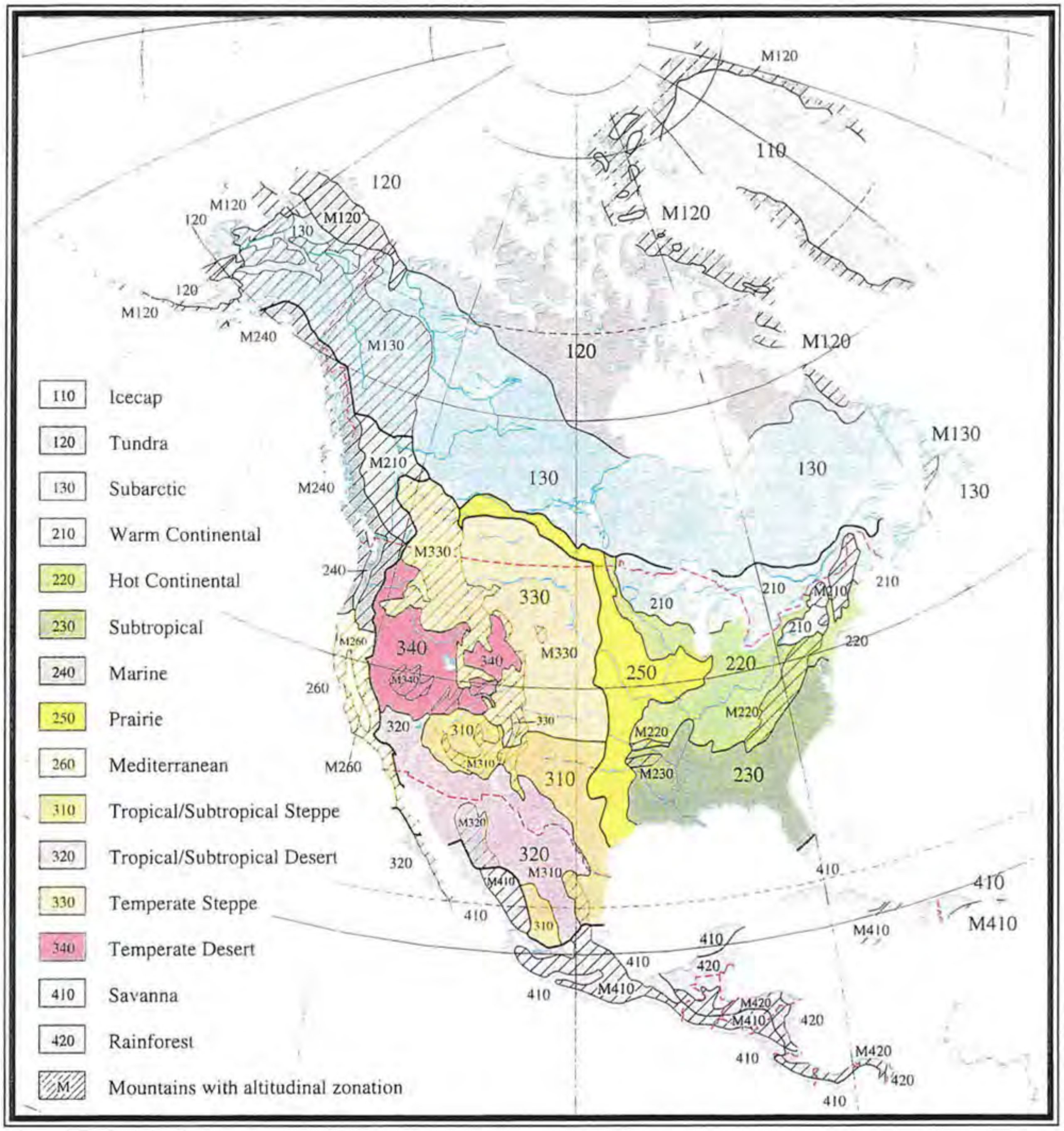
200 Humid Temperate
300 Dry
400 Humid Tropical

Ecoregion DIVISIONS of North America

Second division within Ecoregions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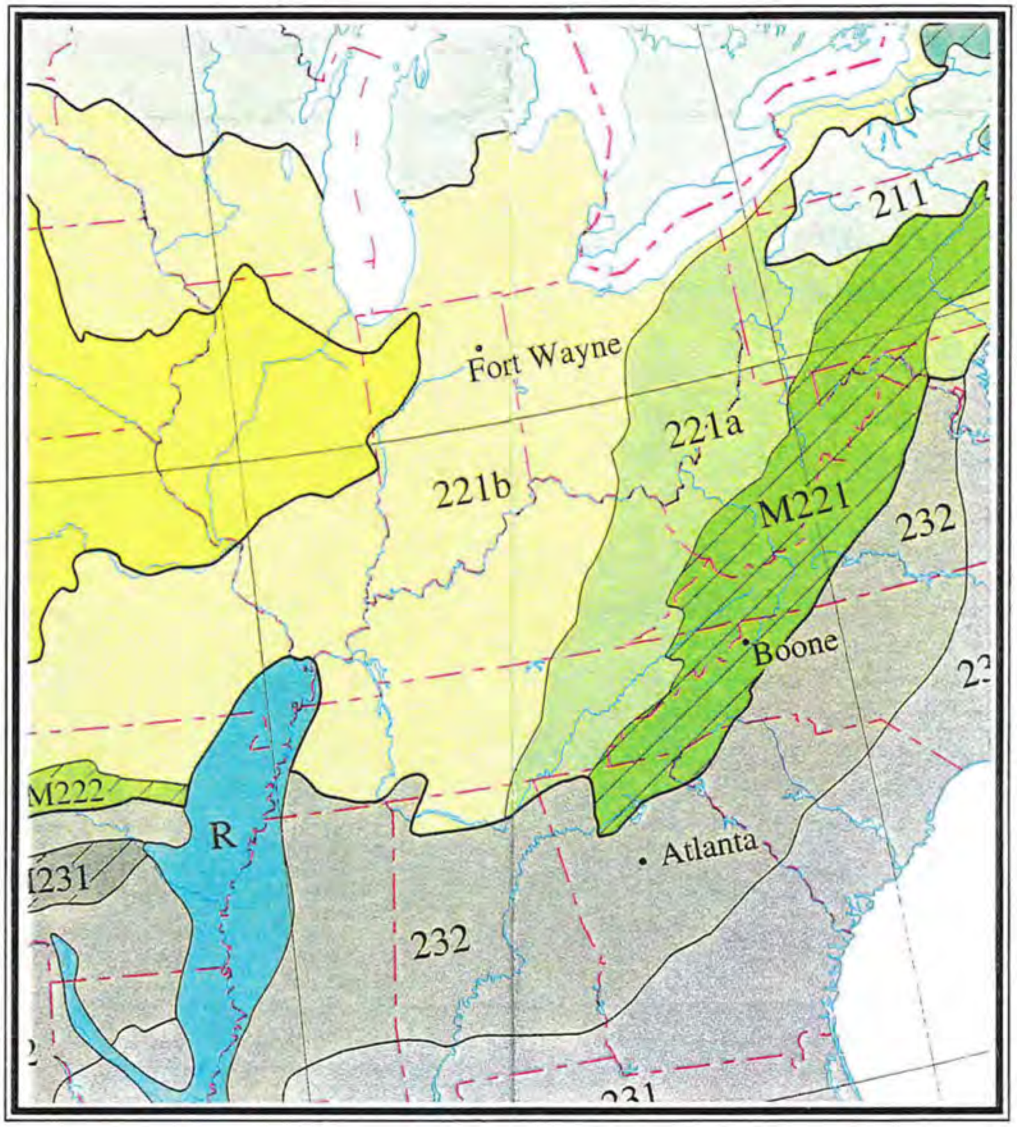
120 Tundra
130 Subarctic
210 Warm Continental
220 Hot Continental
230 Subtropical
240 Marine
250 Prairie
260 Mediterranean
310 Tropical/Subtropical Steppe
320 Tropical/Subtropical Desert
330 Temperate Steppe
340 Temperate Desert
410 Savanna
420 Rainforest
M Mountains with altitudinal zonation
M120
110
120
M120
130
M130
M240
M210
240
M330
330
340
M340
M260
260
M330
250
220
210
M210
M220
M230
230
310
M310
320
M320
M410
410
420
M420

Base from World Databank II
Prepared by the U.S. Geological Survey

Ecoregion PROVINCES of North America

Third division within Ecoregions



Ecoregion Provinces

200 Humid Temperate Domain

210 Warm Continental Division
- 211 Mixed Deciduous-Confierous Forests Province

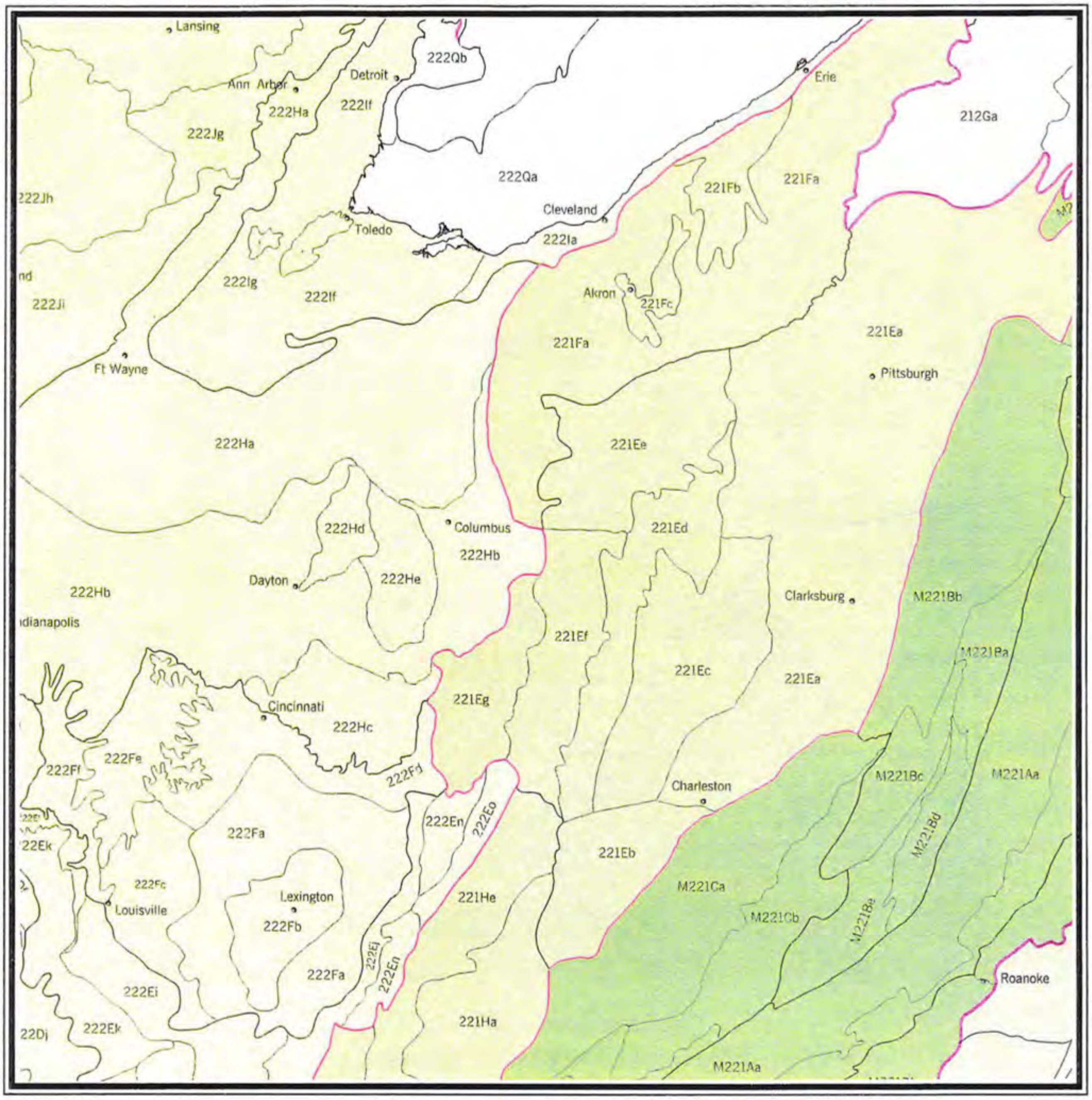
220 Hot Continental Division
- 221a Broadleaved Forests, Oceanic Province
- 221b Broadleaved Forests, Continental Province

M220 Hot continental Mountains
- M221 Deciduous or Mixed forests - Coniferous Forests - Meadow Province
- M222 Broadleaf Forest - Meadow Province

Published by USDA Forest Service, Miscellaneous Publication Number 1548

Ecoregion SECTIONS of the Eastern United States

First division within Subregions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Ann Arbor
Detroit
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222Ha
222If
222Jg
Erie
212Ga
222Jh
222Qa
221Fb
221Fa
Cleveland
Toledo
222Ia
222Ig
222If
222Ji
Akron
221Fc
221Fa
221Ea
Pittsburgh
Ft Wayne
222Ha
221Ee
222Hd
Columbus
222Hb
221Ed
Dayton
222He
222Hb
Clarksburg
M221Bb
M221Ba
221Ef
221Ec
221Ea
221Eg
Cincinnati
222Hc
222Fe
222Ff
222Fd
M221Bc
M221Aa
Charleston
222En
222Eo
222Ek
222Fa
221Eb
M221Bd
M221Ca
222Fc
Louisville
Lexington
222Fb
221He
M221Cb
M221Be
222Ej
222En
222Fa
222Ei
Roanoke
220j
222Ek
221Ha
M221Aa

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USDA Forest Service
1995

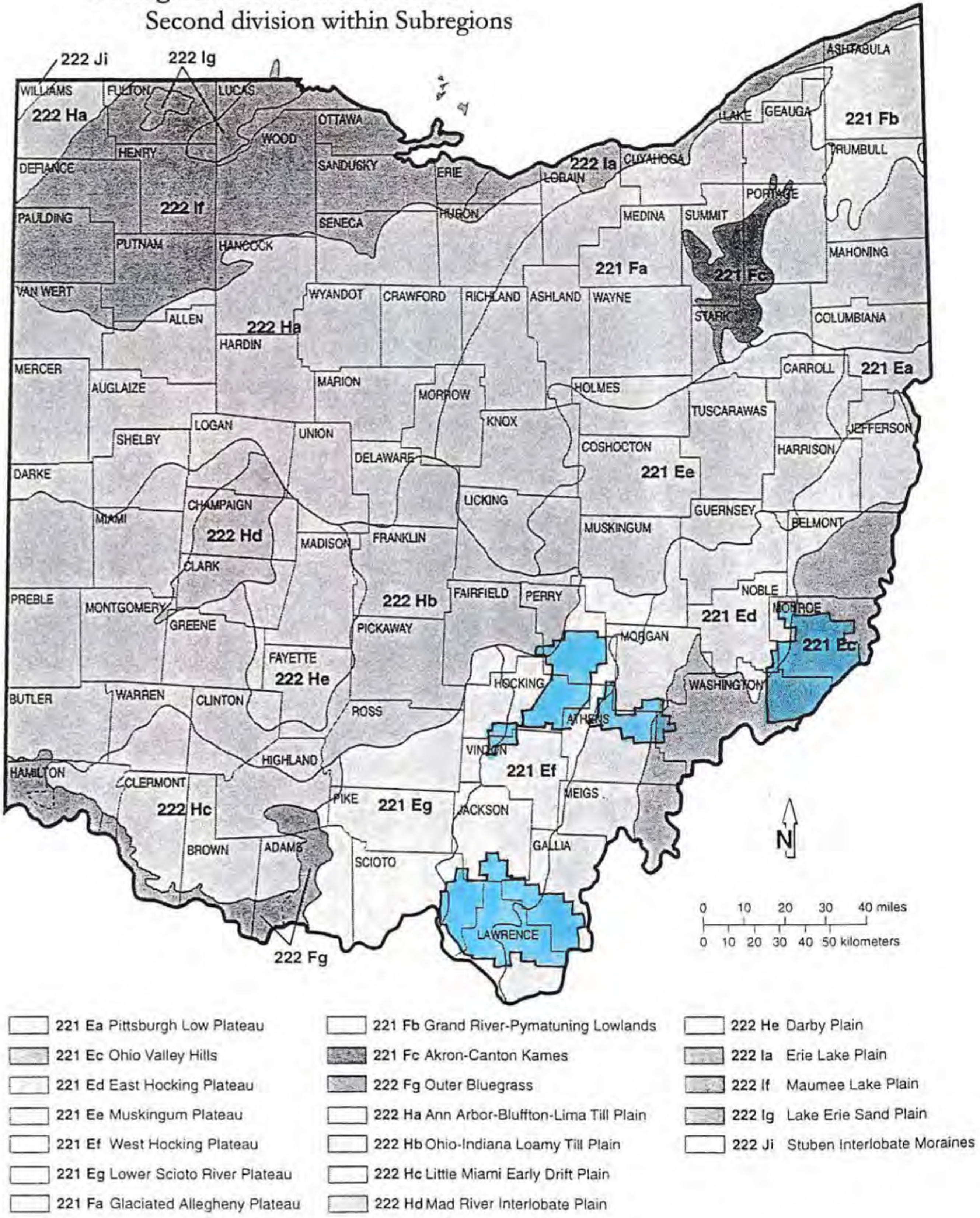
220 Hot Continental Division

221 Eastern Broadleaf Forest (Oceanic) Province

221A Lower New England Section
221B Hudson Valley Section
221C Upper Atlantic Coastal Plain Section
221D Northern Appalacian Piedmont Section
221E Southern Unglaciated Allegheny Plateau Section
221F Western Glaciated Allegheny Plateau Section
221H Northern Cumberland Plateau Section
221I Southern Cumberland Mountains Section
221J Central Ridge and Valley Section

Ecological Subsections of Ohio

Second division within Subregions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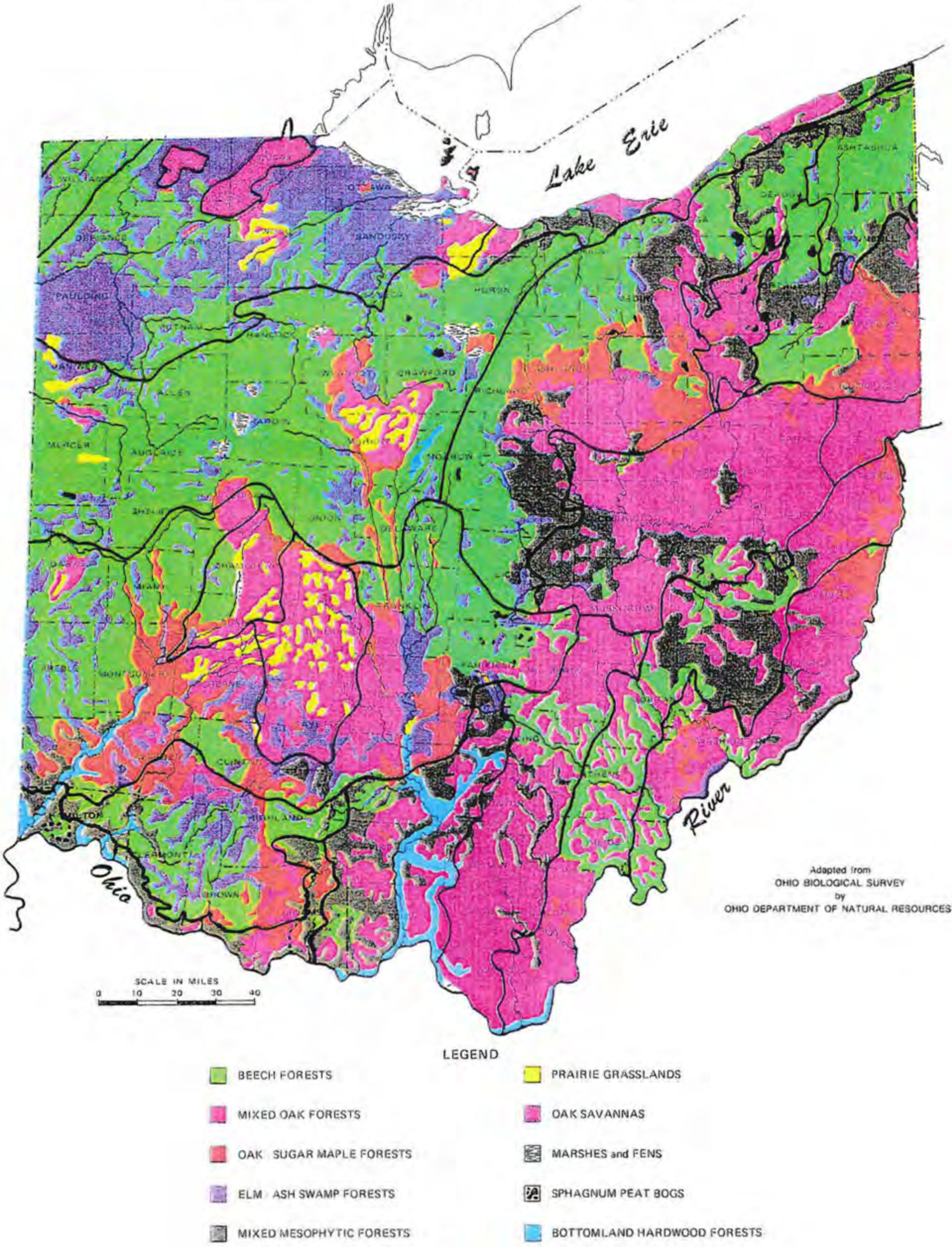
OTTAWA
WOOD
HENRY
DEFIANCE
SANDUSKY
ERIE
222 Ia
CUYAHOGA
LORAIN
ASHTABULA
LAKE
GEAUGA
221 Fb
TRUMBULL
222 If
PAULDING
SENECA
HURON
MEDINA
SUMMIT
PORTAGE
PUTNAM
HANCOCK
221 Fa
221 Fc
MAHONING
VAN WERT
WYANDOT
CRAWFORD
RICHLAND
ASHLAND
WAYNE
STARK
COLUMBIANA
ALLEN
222 Ha
HARDIN
MERCER
AUGLAIZE
MARION
MORROW
HOLMES
CARROLL
221 Ea
TUSCARAWAS
LOGAN
UNION
KNOX
JEFFERSON
SHELBY
DELAWARE
COSHOCTON
HARRISON
221 Ee
DARKE
CHAMPAIGN
LICKING
GUERNSEY
MIAMI
222 Hd
MUSKINGUM
BELMONT
MADISON
FRANKLIN
CLARK
PREBLE
MONTGOMERY
222 Hb
FAIRFIELD
PERRY
NOBLE
221 Ed
MONROE
GREENE
PICKAWAY
MORGAN
221 Ec
FAYETTE
222 He
HOCKING
WASHINGTON
BUTLER
WARREN
CLINTON
ROSS
ATHENS
VINTON
HIGHLAND
221 Ef
HAMILTON
CLERMONT
PIKE
221 Eg
JACKSON
MEIGS
222 Hc
BROWN
ADAMS
GALLIA
SCIOTO
N
LAWRENCE
0 10 20 30 40 miles
0 10 20 30 40 50 kilometers
222 Fg
221 Ea Pittsburgh Low Plateau
221 Ec Ohio Valley Hills
221 Ed East Hocking Plateau
221 Ee Muskingum Plateau
221 Ef West Hocking Plateau
221 Eg Lower Scioto River Plateau
221 Fa Glaciated Allegheny Plateau
221 Fb Grand River-Pymatuning Lowlands
221 Fc Akron-Canton Kames
222 Fg Outer Bluegrass
222 Ha Ann Arbor-Bluffton-Lima Till Plain
222 Hb Ohio-Indiana Loamy Till Plain
222 Hc Little Miami Early Drift Plain
222 Hd Mad River Interlobate Plain
222 He Darby Plain
222 Ia Erie Lake Plain
222 If Maumee Lake Plain
222 Ig Lake Erie Sand Plain
222 Ji Stuben Interlobate Moraines

From: Ohio Department of Natural Resources

5.6 Natural Vegetation of Ohio and Subsections of Ohio

NATURAL VEGETATION OF OHIO
AT THE TIME OF THE EARLIEST LAND SURVEYS


Lake Erie
Ohio
River
ASHTABULA
OTTAWA
SANDUSKY
PAULDING
PUTNAM
HANCOCK
CRAWFORD
ALLEN
MERCER
AUGLAIZE
UNION
DELAWARE
FRANKLIN
HIGHLAND
CLERMONT
BROWN
SCALE IN MILES
0 10 20 30 40
LEGEND
🟩 BEECH FORESTS
🟪 MIXED OAK FORESTS
🟥 OAK SUGAR MAPLE FORESTS
🟪 ELM ASH SWAMP FORESTS
▨ MIXED MESOPHYTIC FORESTS
🟨 PRAIRIE GRASSLANDS
🟪 OAK SAVANNAS
▤ MARSHES and FENS
▨ SPHAGNUM PEAT BOGS
🟦 BOTTOMLAND HARDWOOD FORESTS

Adapted from
OHIO BIOLOGICAL SURVEY
by
OHIO DEPARTMENT OF NATURAL RESOURCES*

Reference 5.7 Climatic Data

Athens Climate Data Summarized (Data from Athens, OH)

Month	Avg. High (F°)	Avg. Low (F°)	Ave. Ppt (inches)
January	35.1	21	3.12
February	42.1	23.4	2.63
March	54.3	28.4	3.69
April	64.7	40.7	3.65
May	74.5	50.9	3.91
June	81.2	58.2	3.05
July	85.5	64	4.11
August	84.4	63.3	3.29
September	77.4	54.3	3.05
October	65.4	44.4	2.43
November	54.6	35.3	2.68
December	43	26.4	3.01

Ironton Climate Data Summarized (Data from Huntington, WV)

Month	Avg. High (F°)	Avg. Low (F°)	Avg. Ppt (inches)
January	40.7	23.2	2.83
February	44.2	26.1	2.9
March	56.5	35.5	3.68
April	66.8	43.8	3.43
May	75.2	52.4	4.24
June	81.3	60.4	3.51
July	84.3	65	4.65
August	83.1	63.9	3.83
September	78	57.1	2.93
October	67.2	45	2.83
November	55.9	37	3.3
December	45.3	28.4	3.36

Marietta Climate Data Summarized (Data from Parkersburg, WV)

Month	Avg. High (F°)	Avg. Low (F°)	Avg. Ppt (inches)
January	38.1	21.7	2.59
February	42	23.9	2.74
March	54	33.6	3.87
April	64.4	42.1	3.6
May	74	52.4	3.91
June	82.5	59.7	3.67
July	84.2	64.6	4.26
August	82.9	63.5	4.16
September	76.8	56.7	3.19
October	65.9	44.8	3.03
November	54.3	36.5	3.28
December	43	27.1	3.21

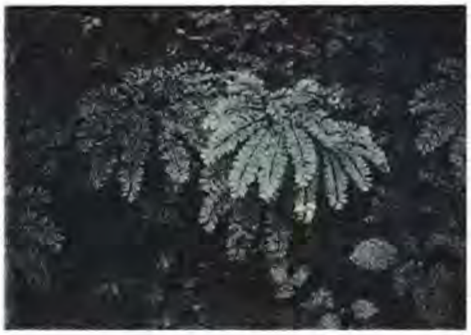
6.0 Plant Descriptions

This section contains descriptions and photographs of the diagnostic species listed in the text for each ELTP. Additional plant identification references are recommended for plants not described here.

The plants are arranged in alphabetical order by their Latin names. See Reference 5.3 for a cross-walk to common names.

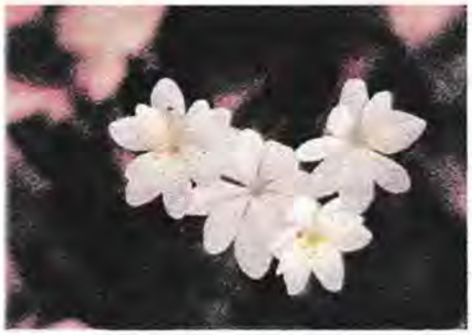
Adiantum pedatum **- Maidenhair Fern**

Plant Family: *Adiantoceae*
Maiden Hair Fern Family
Habit: Fern, 4-24 inches tall
Leaves: Resistant to water, deciduous
Flowers: Purple or purplish black petiole



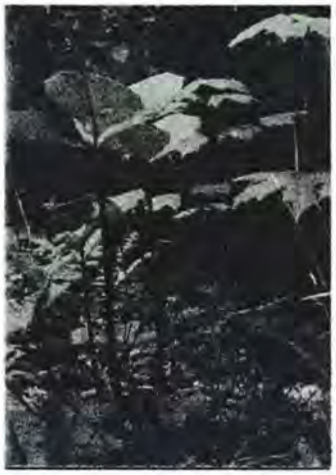
Anemonella thalictroides **- Rue Anemone**

Plant Family: *Ranunculaceae*
Buttercup Family
Habit: Perennial Herb, 4-12 inches tall
Leaves: 3 toothed towards end,
rounded at the base
Flowers: April-May

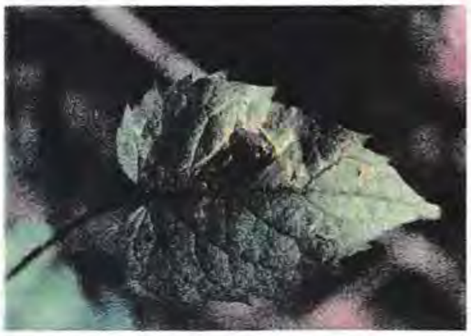


Arisaema triphyllum **- Jack-in-the-pulpit**

Plant Family: *Araceae*
Arum Family
Habit: Perennial Herb, 12-18 inches tall
Leaves: 3 leaflets - usually 2 leaves
Flowers: Striped green and purple spathe,
spring and early summer
Fruit: cluster of red berries

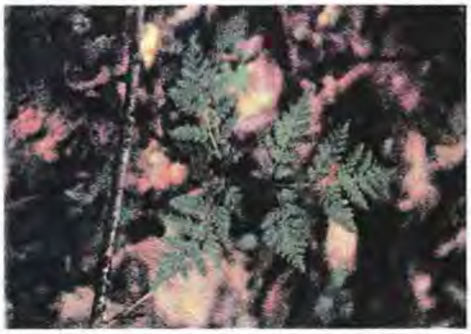


Aster macrophyllus **- Big Leaved Aster**



Plant Family: *Asteraceae*
Aster Family
Habit: Perennial Rhizomateous & colonial herb, 8-48 inches tall
Leaves: Large heart shaped leaves
Flowers: Whitish flowers in the fall

Botrychium virginianum **- Rattlesnake Fern**

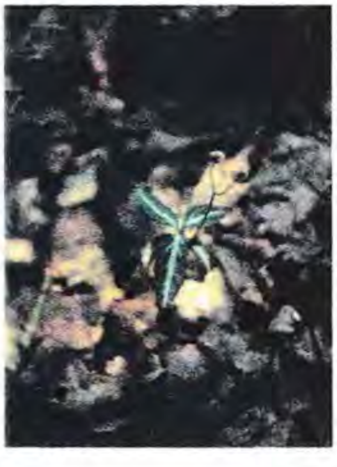


Plant Family: *Ophioglossaceae*
Adder's Tongue Family
Habit: fern, 8-30 inches
Leaves: Pinnately compound
Flowers: Sporangia short stalked

Brachyelytrum erectum **- Grass**

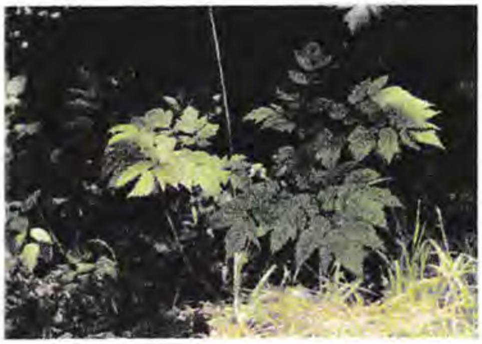
Plant Family: *Poaceae*
Grass Family
Habit: Perennial Grass, 20-40 inches
Leaves: Feels rough, ciliate margined

Chimaphila maculata **- Spotted Wintergreen**



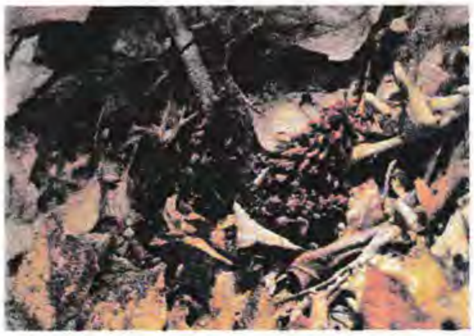
Plant Family: *Pyrolaceae*
Shinleaf Family
Habit: Perennial evergreen, 4-8 inches tall
Leaves: Striped with white along the mid-vein
Flowers: 5 white petals, June-August

Cimicifuga racemosa - Black Cohosh



Plant Family: *Ranunculaceae*
Buttercup Family
Habit: Perennial herb, 1-2.5 meter tall
Leaves: 3 leaves- pinnately compound
Flowers: long erect flower stalk arising
from leaf area -many tiny white flowers

Conopholis americana - Squawroot

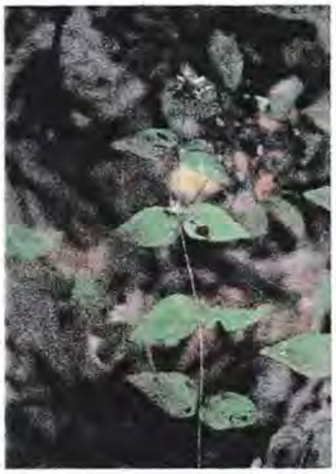


Plant Family: *Orobanchaceae*
Broom-rape Family
Habit: Root parasitic, herbs without chlorophyll
2-8 inches tall
Leaves: None
Flowers: May-June

Cryptotaenia candensis - Honewort

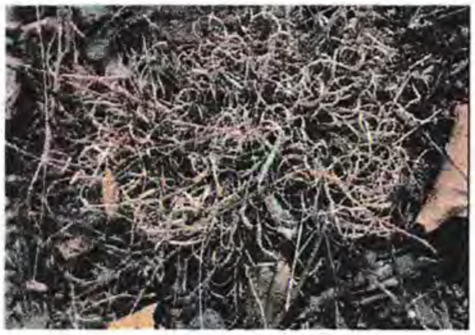
Plant Family: *Apiaceae*
Carrot Family
Habit: Perennial herb, 12-40 inches tall
Leaves: trifoliate leaves - sharply, irregularly
toothed margins- sometimes lobed
Flowers: June-July, white petals

Cunila origanoides - Wild Oregano



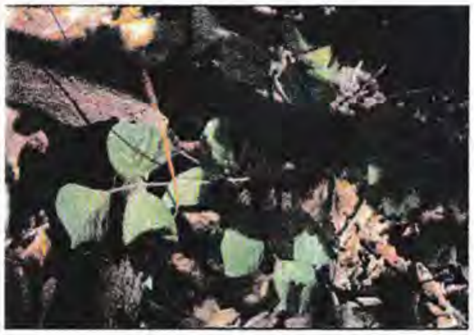
Plant Family: *Lamiaceae*
Mint Family
Habit: Perennial herb, 8-16 inches tall
Leaves: Sub-sessile, usually with a few teeth
Flowers: August-October, rose-purple to white

Danthonia spicata **- Poverty Grass**



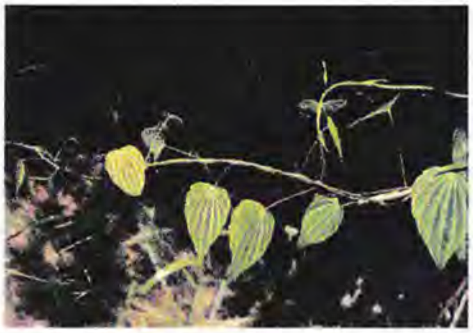
Plant Family: *Poaceae*
Grass Family
Habit: Perennial grass
Leaves: Curly leaf blades,
tuft of white hairs on sides where
leaves meet stalk (sheath)

Desmodium nudiflorum **- Tick trefoil**



Plant Family: *Fabaceae*
Bean Family
Habit: perennial herbs, 4-12 inches
Leaves: 3-foliate leaves
Flowers: July-September, separate stalk
with pink to purple flowers

Dioscorea quaternata **- Whorled Yam**

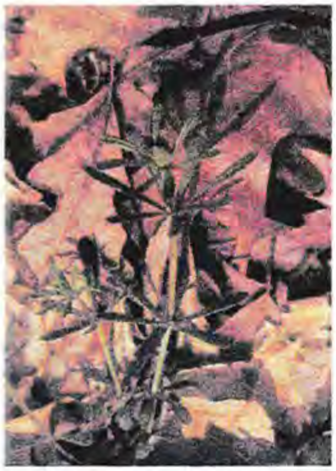


Plant Family: *Dioscoreaceae*
Yam Family
Habit: perennial vine
Leaves: Lower leaves in whorls of 4-7 leaves
Flowers: June-July, flowers white to greenish yellow
Fruit: a 3-winged capsule

Epifagus virginiana **- Beech Drops**

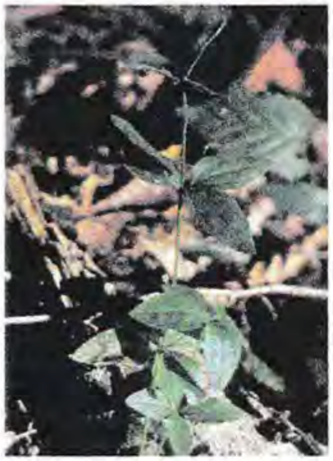
Plant Family: *Orobanchaceae*
Broom Rape Family
Habit: parasitic herb without chlorophyll
Leaves: Clasping stems, branched,
generally pale brown.
Flowers: August-October

Galium aparine - Cleavers



Plant Family: *Rubiaceae*
Madder Family
Habit: annual herb, 4-40 inches
Leaves: Stem with hooked barbs
Leaves in whorls of 6-8
Flowers: tiny white flowers

Galium circaezans - Forest bedstraw

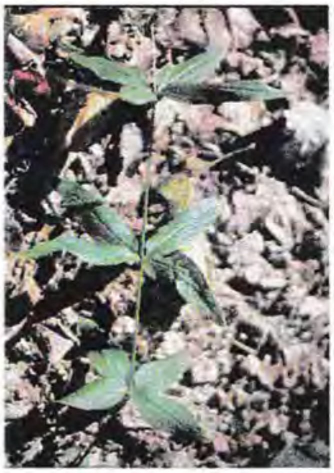


Plant Family: *Rubiaceae*
Madder Family
Habit: perennial herb, 4-24 inches
Leaves: Leaves in 4. Broadest near the middle.
Leaves with 3-5 nerves -
usually 3 prominent veins.
Flowers: June-July, Corolla greenish purple

Galium conconnum - Shining bedstraw

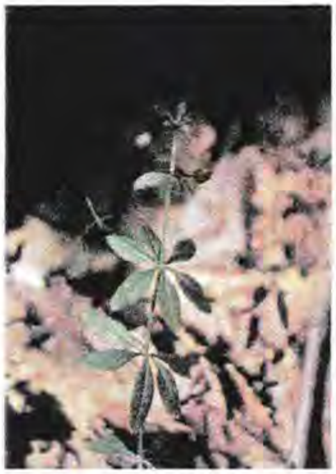
Plant Family: *Rubiaceae*
Madder Family
Habit: perennial herb, 8-20 inches
Leaves: Spreading stems,
Usually several stems growing together
Linear - narrow leaves
Flowers: June-August

Galium lanceolatum - Wild Licorice



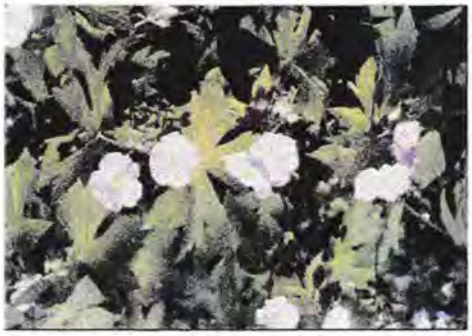
Plant Family: *Rubiaceae*
Madder Family
Habit: perennial herb, 12-28 inches
Leaves: Leaves in 4.
Upper leaves lanceolate
Flowers: June-July, Flowers turn purple in age

Galium triflourm - Sweet Scented Bedstraw



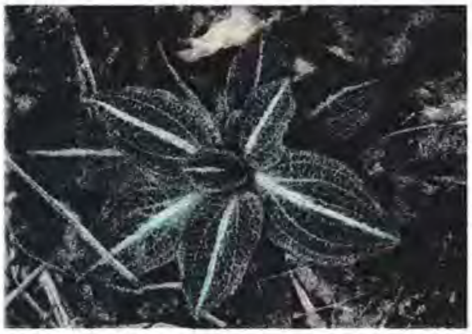
Plant Family: *Rubiaceae*
Madder Family
Habit: low-lying perennial herb, 4-32 inches
Leaves: Odor of vanilla, usually 6 leaflets
one nerve/leaf
Flowers: June-August

Geranium maculatum - Wild Geranium



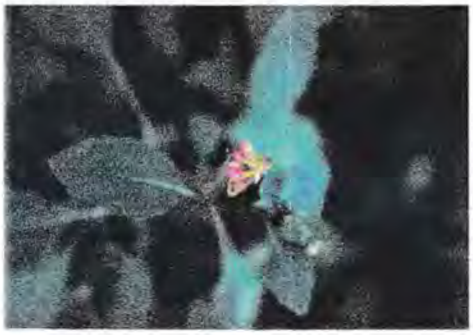
Plant Family: *Geraniaceae*
Geranium Family
Habit: perennial herb, 1.2-2.8 inches
Leaves: pair of leaves on the stem
Flowers: April-June, pink

Goodyera pubescens - Downy Rattlesnake Plantain



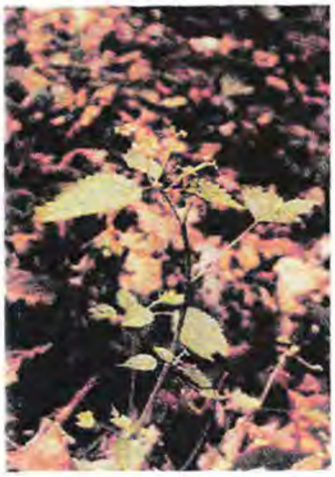
Plant Family: *Orchidaceae*
Orchid Family
Habit: perennial herb, 4-16 inches
Leaves: leaves all basal, evergreen with white lines
Flowers: July-August, spike of white orchid flowers

Impatiens capensis - Orange Jewelweed



Plant Family: *Balsaminaceae*
Touch-me-not Family
Habit: annual herb, 20-60 inches
Leaves: wavy margins with a short sharp point
stem light green-very watery
Flowers: June-September, hanging on thin pedicels
usually orange-yellow with reddish
brown spots, seeds explode when jarred.

Laportea canadenses **- Wood Nettle**

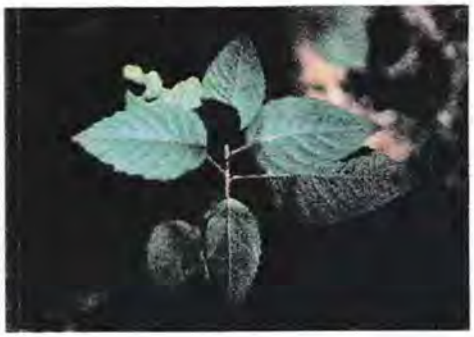


Plant Family: *Urticaceae*
Nettle Family
Habit: perennial herb, 20-40 inches
Leaves: alternate stems with stinging hairs
coarsely toothed
Flowers: July-August, small greenish flowers

Lindera benzoin **- Spicebush**

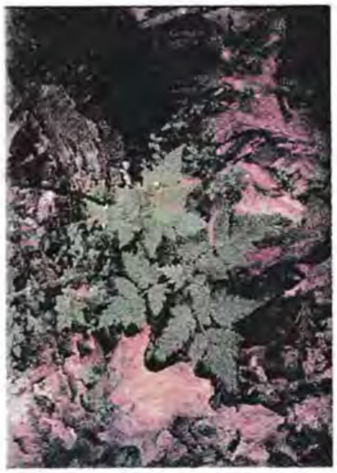
Plant Family: *Lauraceae*
Laurel Family
Habit: woody shrub to 16 feet
Leaves: when crushed smells lemony
Flowers: March-May, flowers appear before leaves
Fruit: Bright red.

Monarda clinopodia **- Basil Bee Balm**



Plant Family: *Lamiaceae*
Mint Family
Habit: perennial herb to 3 feet
Leaves: opposite, serrate
Flowers: June-July, whitish or pinkish with dark spots
fragrant

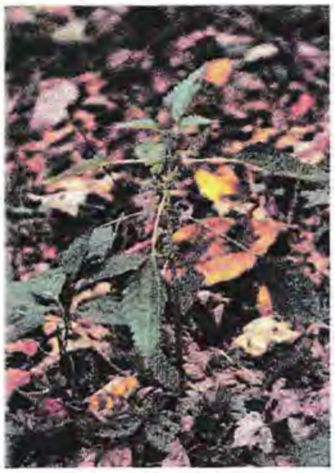
Osmorhiza claytonii **- Long Styled Sweet Anise**



Plant Family: *Apiaceae*
Carrot Family
Habit: perennial herb 16-32 inches
Leaves: finely dissected leaves,
broken stems have carrot odor
stems have hairs
Flowers: May-June, flowers white, small

Pilea pumila - Clearweed

Plant Family: *Urticaceae*
Nettle Family
Habit: annual herb 4-20 inches
Leaves: stem is clear and very watery
shiny
Flowers: July-September,
whitish or greenish flowers

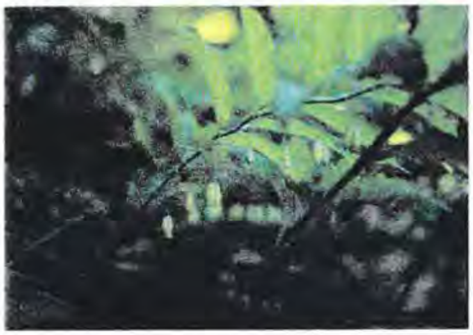


Poa cuspidata - Bluegrass

Plant Family: *Poaceae*
Grass Family
Habit: perennial grass 4-24 inches
Leaves: end of leaf boat shaped
bluish-green
Flowers: early spring

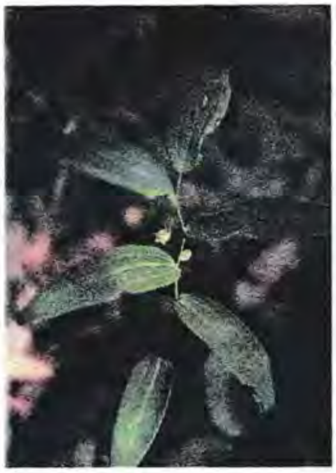
Polygonatum biflorum - Smooth Solomon's Seal

Plant Family: *Liliaceae*
Lilly Family
Habit: perennial arching or erect herb, 20-48 inches
Leaves: smooth underneath
Flowers: May-July, greenish white or yellowish green,
hanging below leaves
usually flowers in clusters of 2

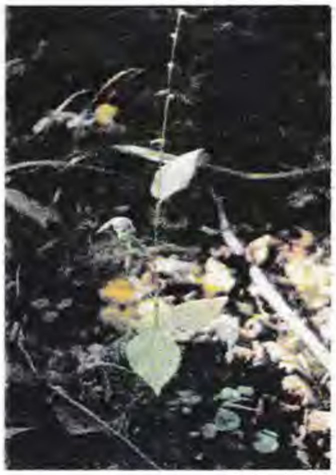


Polygonatum pubescens - Hairy Solomon's Seal

Plant Family: *Liliaceae*
Lilly Family
Habit: perennial arching or erect herb, 20-36 inches
Leaves: hairs on the veins beneath
Flowers: May-July, greenish yellow flowers
hanging below leaves
usually flowers in clusters of 2-3 flowers

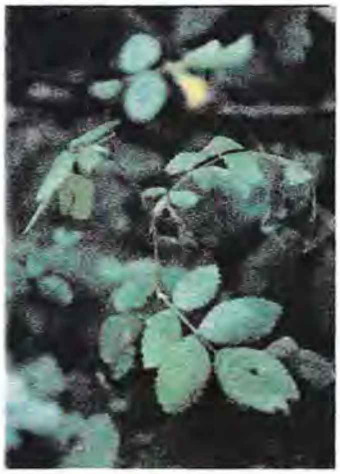


Polygonatum virginianum **- Jumpseed**



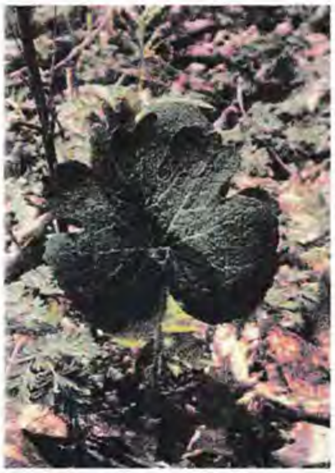
Plant Family: *Polygonaceae*
Smartweed Family
Habit: erect rhizomateous, perennial, 4-40 inches
Leaves: alternate, smooth margins,
sheath around stem with long
threads extending from it.
Flowers: raceme of greenish white flowers

Rosa carolina **- Carolina rose**



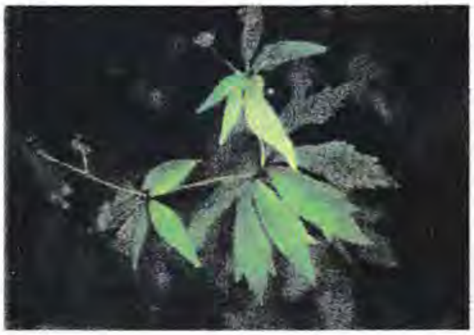
Plant Family: *Roseaceae*
Rose Family
Habit: single or little branched thorny vine
up to 3 foot
Leaves: compound leaves with 3-7 leaflets
with toothed margins
Flowers: single flowers on stem

Sanguinaria canadensis **- Blood Root**



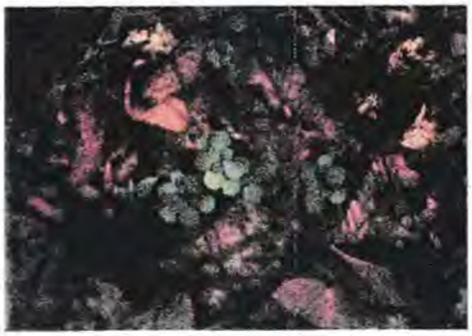
Plant Family: *Papaveraceae*
Poppy Family
Habit: herbaceous perennial, 4-20 inches
Leaves: one basal leaf much lobed (5-9 lobes)
persists until about mid-summer
Flowers: March-April,
large white flower with 8 (up to 16) petals

Sanicula canadensis **- Black Snakeroot**



Plant Family: *Apiaceae*
Carrot Family
Habit: biennial, 4-32 inches
Leaves: with 3-5 lobes
Flowers: June-August; white
Fruit: with hooked barbs

Sedum ternatum - Stonecrop



Plant Family: *Crassulaceae*
Stonecrop Family
Habit: succulent perennial herb, 4-8 inches
Leaves: fleshy leaves
Flowers: May-June, white flowers with black dot

Senecio aureus - Heart Leaved Groundsel

Plant Family: *Asteraceae*
Sunflower Family
Habit: perennial herb, 12-32 inches
Leaves: basal leaves with wavy margins
and long petiole
Flowers: April-August, bright yellow ray
and orange colored disc flowers

Smilacena racemosa - False Solomon's Seal

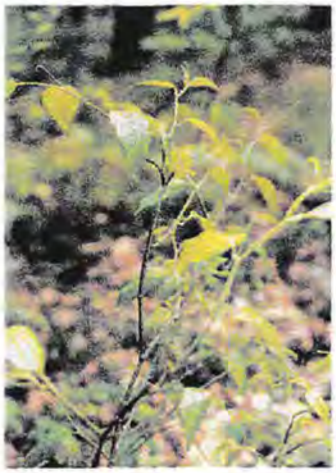
Plant Family: *Liliaceae*
Lilly Family
Habit: perennial arching stemmed herb, 8-40 inches
Leaves: alternate smooth margins
Flowers: May-June, white to green
Fruit: red with purple spots

Smilax glauca - Sawbriar

Plant Family: *Smilaceae*
Catbriar Family
Habit: Slender woody vine with spines
Leaves: underside of leaves whitish,
leaves deciduous
Flowers: May-June, greenish yellow

Smilax rotundifolia **- Greenbrier**

Plant Family: *Smilaceae*
Catbriar Family
Habit: Woody vine with thorns
Leaves: stem very angular, usually 4-angled
leaves green on both sides
Flowers: May-June, green flowers

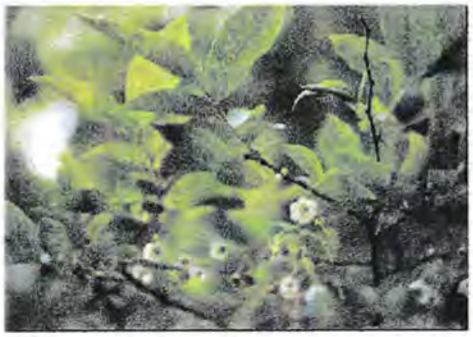


Vaccinium pallidum **- Hillside Blueberry**

Plant Family: *Ericaaceae*
Heath Family
Habit: Colonial shrub, 8-32 inches
Leaves: whitish beneath
Flowers: April-June

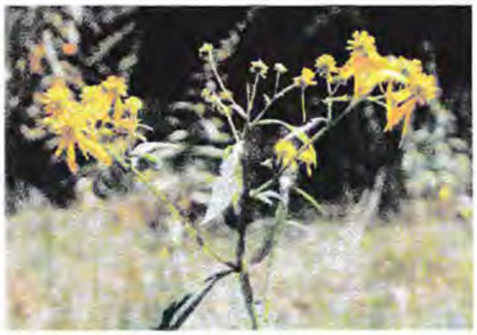
Vaccinium stamineum **- Deerberry**

Plant Family: *Ericaaceae*
Heath Family
Habit: Deciduous shrub up to 5 feet
Leaves: margins entire
Flowers: May-June,
stamens extend out beyond flower



Verbesina alternifolia **- Wingstem**

Plant Family: *Asteraceae*
Sunflower Family
Habit: Herbaceous perennial, 3-9 feet
Leaves: winged stem, alternate leaves
Flowers: August-October, bright yellow flowers



Viburnum prunifolium - Cherry Leaf Viburnum

Plant Family: *Caprifoliaceae*
Honeysuckle Family
Habit: Woody shrub to 26 feet
Leaves: opposite leaves
Flowers: April-May, white flowers
Fruit: bluish black

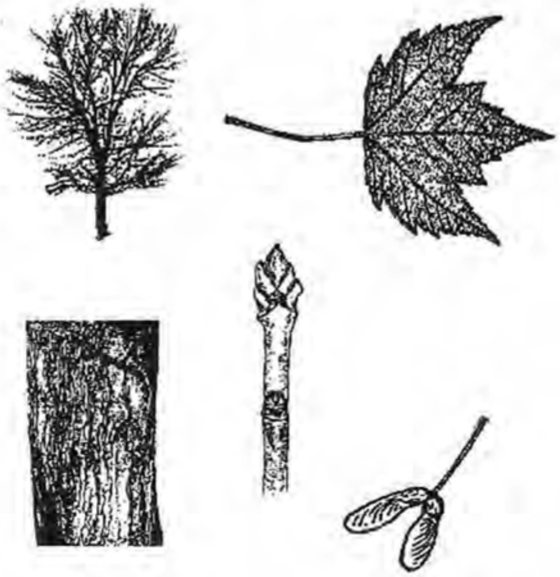
Viola striata - Creamy Violet

Plant Family: *Violaceae*
Violet Family
Habit: Perennial herb, 2.5-12 inches
Leaves: heart-shaped leaves with many small teeth
Flowers: April-June, creamy white

7.0 Tree and Shrub Descriptions

This section contains descriptions and drawings of the diagnostic tree and shrub species listed in the text for each ELTP. These drawings were taken, with the gracious permission of the authors, Bill Perine and Dennis Profant from their book Trees, Shrubs, and Vines of Southeastern Ohio. That book contains many other trees and shrubs not contained in these pages and is recommended for further information. The trees are arranged in alphabetical order by their Latin names. See Reference 5.3 for a cross-walk to common names.

Acer rubrum - Red Maple



Plant Family: Aceraceae

Leaves: Opposite, coarsely toothed, three shallow short-pointed lobes, red petioles, leaves hairy and white underneath.

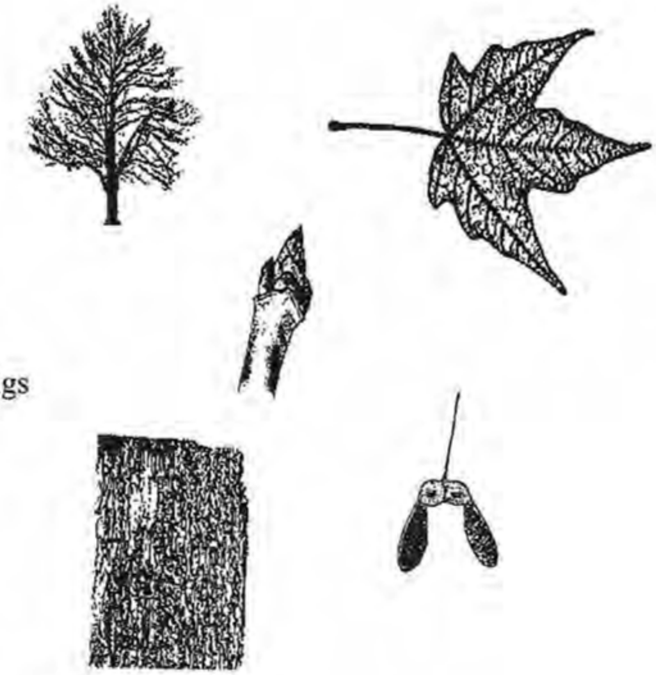
Twigs: Reddish colored, slender and hairless. Buds are green, turning to red in fall and winter, slightly pointed to blunt, moderately scaled.

Flower: buds appear in whorled clusters.

Bark: Smooth and gray when young, Older trees have some furrowing in the form of long strips which tightly hug the trunk.

Fruits: Paired forking keyed samaras. Reddish.

Acer saccharum - Sugar Maple



Plant Family: Aceraceae

Leaves: Opposite, simple, shallow lobes and only moderately toothed, green on both sides.

Twigs: Buds are brown, heavily scaled and sharp pointed (sugar-coned shape). New growth twigs are also brown. Otherwise green to brown.

Bark: Bark is gray-brown, rough to the touch and becomes furrowed with age.

Fruits: Paired samaras.Brown.

Habitat: Dominant canopy species on mesic slopes.

Aesculus octandra - Yellow or Sweet Buckeye

Plant Family: Hippocastanaceae

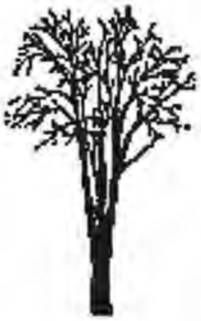
Leaves: Opposite, compound, palmate, and finely serrate. 5-7 leaflets.

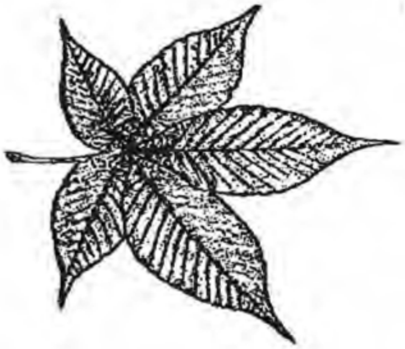
Twigs: Thick, often hairy, light in color with large, orange-colored buds. Bud scales have striations but no raised keel as in Ohio buckeye buds. No bad odor with broken twigs.

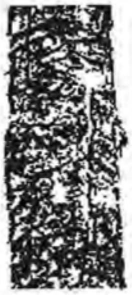
Bark: Light gray-brown and smooth. On older trees bark splits into square-like plates.

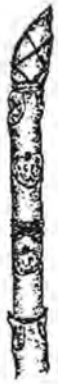
Fruits: 1-3 large brown nuts with a white center spot per husk. Protective husk is smooth and spineless and splits on 2-3 lines..

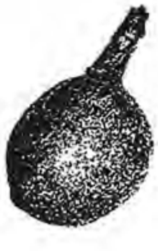
Habitat: Prefers mesic north-facing slopes.











Carpinus caroliniana - Blue Beech or Musclewood

Plant Family: Corylaceae

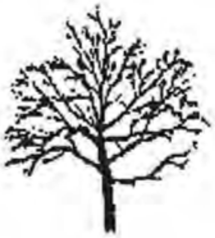
Leaves: Elongated and alternate. Simple with doubly serrate margins. The leaves of this species are nearly identical to those of Ironwood (Hop Hornbeam).

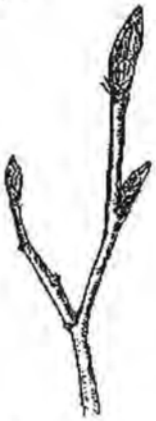
Twigs: Slender, zigzag, usually hairless. Bud scales have striations and appear stacked and angled. Almost indistinquishable from Ironwood.

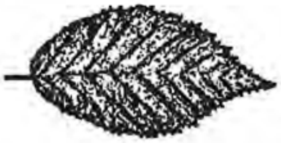
Bark: Smooth, hard, blue-gray bark which is fluted like the ripple of muscle.

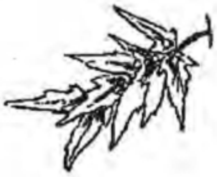
Fruits: Hard seed protected by a 3-pronged bract. Clustered in an elongated group.

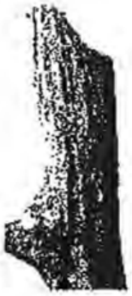
Habitat: Understory tree. Often found along creeks.

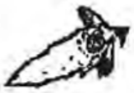












Carya glabra - Pignut Hickory

Plant Family: Juglandaceae

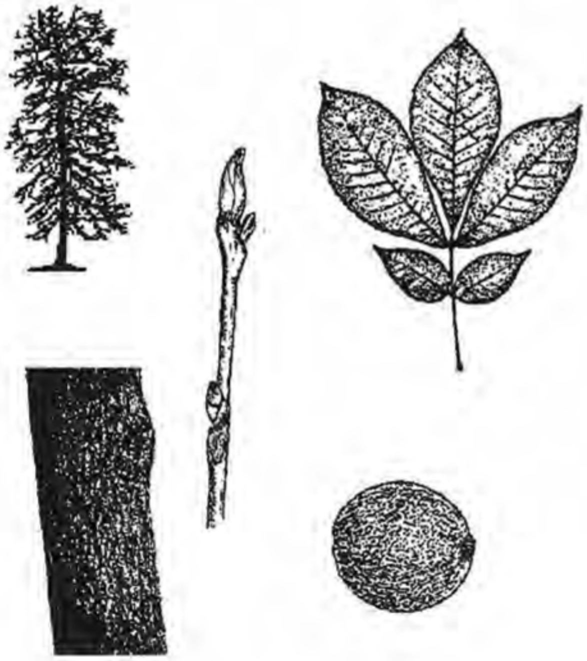
Leaves: Alternate, compound, normally 5 leaflets, sometimes 7. Lance-shaped, largest toward tip.

Twigs: Thinner and the buds smaller than other hickories. Buds are elongated and scaled. Twigs are shiny, brown, smooth, and hairless.

Bark: Tight and thinly furrowed. Older trees often appear almost shaggy.

Fruits: Thin husked, oval nut. Splits to middle. Nut is usually not angled, thickshelled.

Habitat: Upper slopes but may be found on a variety of well-drained sites.



Carya ovata - Shagbark Hickory

Plant Family: Juglandaceae

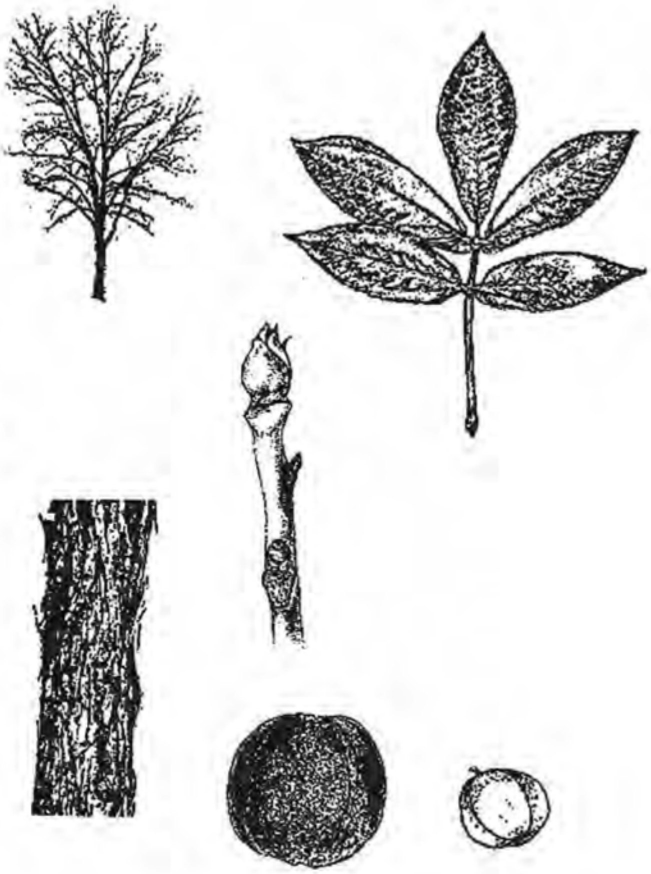
Leaves: Alternate, compound, 5-7 leaflets, and finely serrate margins.

Twigs: Thick, stout, dirty brown and hairy. Buds are large, elongated and covered with purplish-black scales.

Bark: Shaggy, splitting into long, curved strips. Young trees will not have shaggy bark.

Fruits: Round with thick husk. Nut is elliptical and angled, slightly flattened.

Habitat: Prefers high slopes and ridges, but may be found in most ecosystems.



Euonymus atropurpureus - Wahoo, Burning Bush

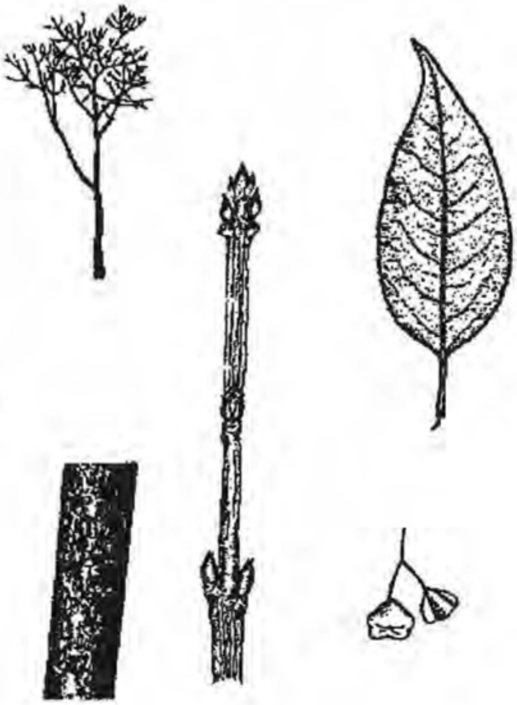
Plant Family: Celastraceae

Leaves: Opposite, simple with serrated margins. On young shoots, leaves may appear alternate. Hairy beneath.

Twigs: Green to purplish green, new growth often round, but older growth has square stems. Buds are green and scaled. Lenticels pale and prominent.

Fruits: Four-sided capsules, white changing to bright pink in the fall. Capsule splits exposing red seeds.

Habitat: Most commonly found in the understory on rich, mesic sites. Shrub to small tree.



Fagus grandifolia - American Beech

Plant Family: Fagaceae

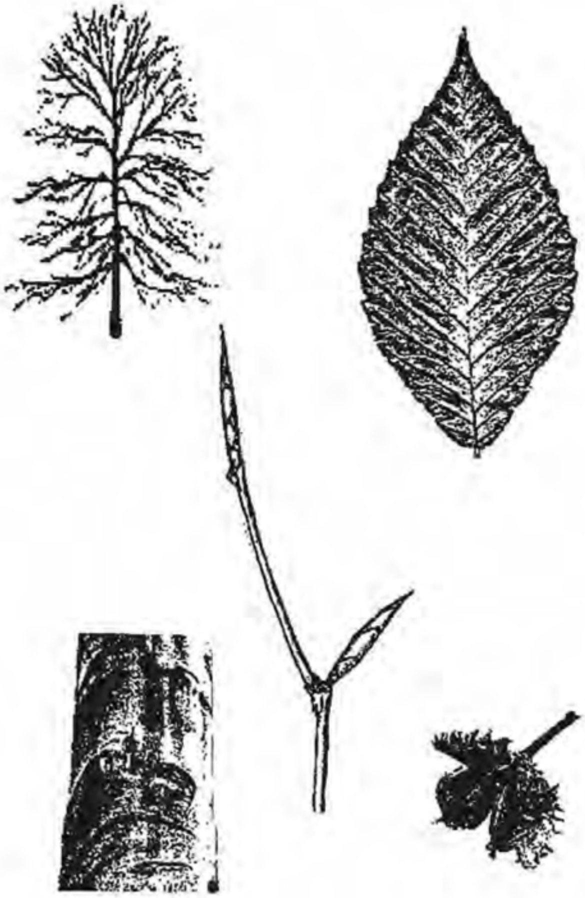
Leaves: Alternate, simple, and toothed with prominent veins extending to the leaf margins. Leaves spread in two rows. Leaves are persistent in winter.

Twigs: Gray with elongated, spear-like or cigar-shaped buds in winter with orange or rusty scales.

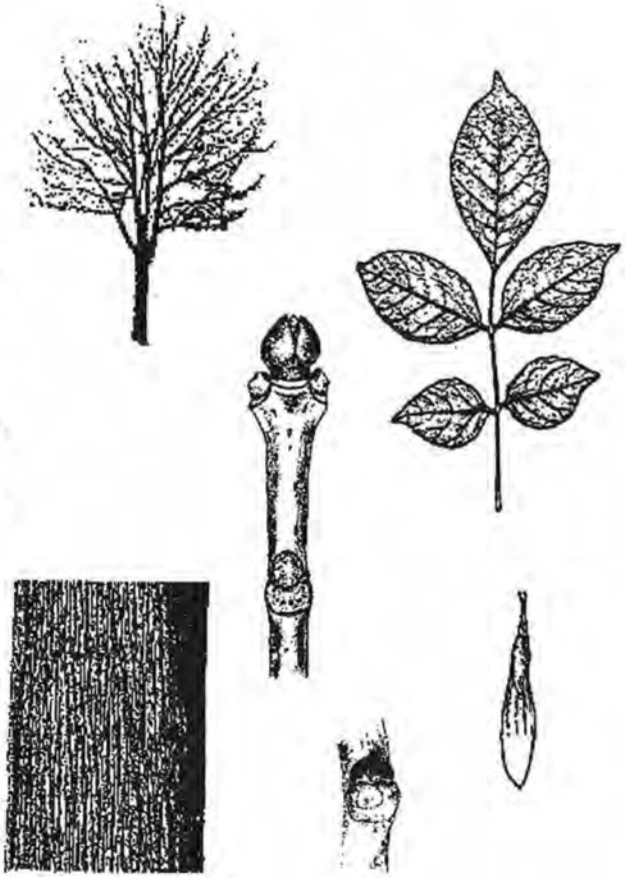
Bark: Steel-gray colored, thin and susceptible to damage. Thin bark and tendency to heart rot leads this tree to normally have several cavities and wildlife dens.

Fruits: Edible 3-sided nuts in a prickly bur-like husk. Usually 2 nuts inside, shiny brown.

Habitat: Frequently dominant on mesic sites and north-facing slopes.



Fraxinus americana - White Ash



Plant Family: Oleaceae

Leaves: Opposite, compound, normally 5-9 leaflets. Usually entire but occasionally serrate with green above and white (and sometimes hairy) below.

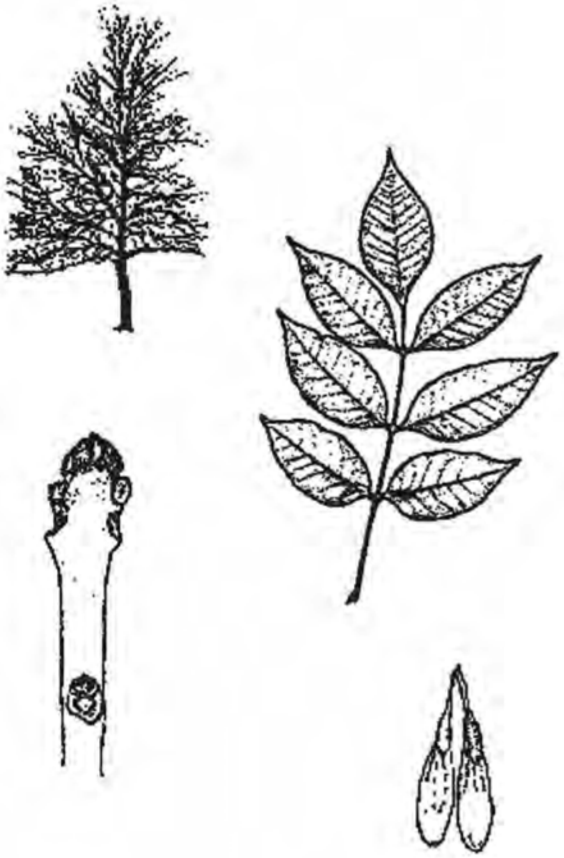
Twigs: Glabrous, with terminal buds which are tent-shaped or resemble the tip of a Phillip's screwdriver. Lateral buds break the plane of the leaf scar and sit inside as if in a saddle.

Bark: Slightly furrowed and forms a criss-cross pattern such as X's or diamonds.

Fruits: Samaras shaped like a boat rudder or canoe paddle. Hang in clusters

Habitat: Mixed sites but prefers uplands.

Fraxinus pennsylvanica - Green Ash



Plant Family: Oleaceae

Leaves: Opposite, compound, 5-9 leaflets. Entire and green on both sides, although paler and sometimes hairy below.

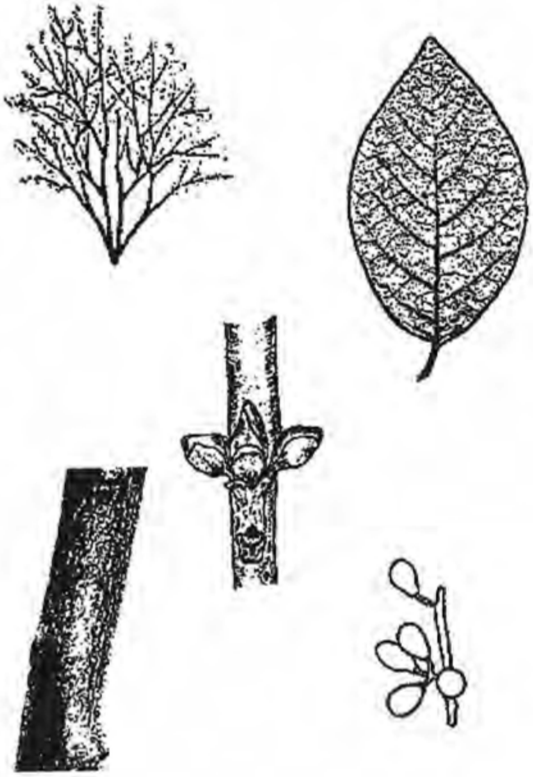
Twigs: Terminal bud very similar to White Ash. Lateral buds sit flat on top of the leaf scar. Lateral buds are the most reliable way to differentiate White and Green ash.

Bark: Similar to White Ash.

Fruits: Clusters of flat samara with a long thin seed.

Habitat: Prefers mesic bottomlands but found on a variety of sites.

Lindera benzoin - Spicebush



Plant Family: Lauraceae

Leaves: Alternate, simple and entire, leaf is oblong or egg-shaped. Aromatic when crushed. Bright green above, whitish below.

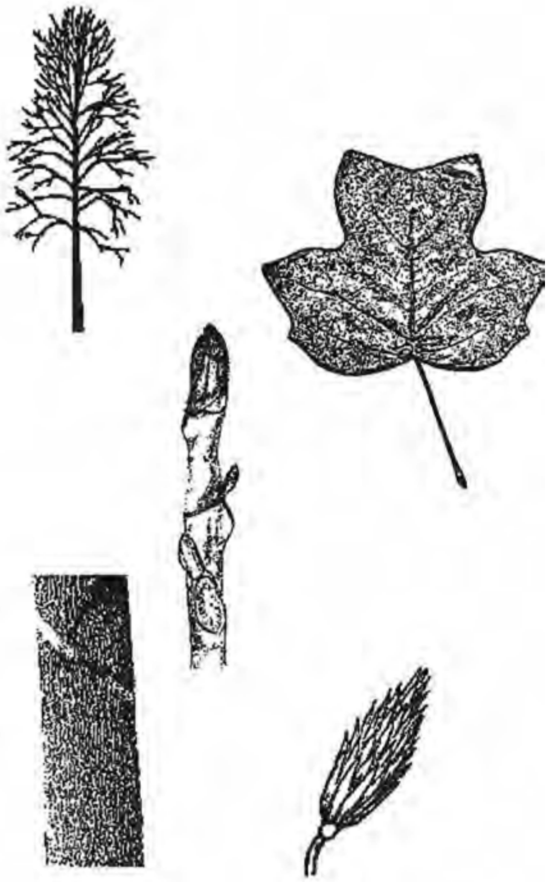
Twigs: Thin, and dark greenish-brown in color. In fall and winter the flower buds will be rounded, BB-shaped. May occur in pairs or be whorled around the twig.

Bark: Light brown to gray, flaking into thin strips with prominent light-colored corky lenticels.
Spicy to the taste.

Fruits: Solitary or in small clusters on short stalks. Glossy red, fleshy, spicy, 1-seeded.

Habitat: Low moist woodlands.

Liriodendron tulipifera - Tulip Poplar



Plant Family: Magnoliaceae

Leaves: Alternate, simple with entire margins. The top appears to be cropped and the leaf is shaped like a tulip. Long stalks.

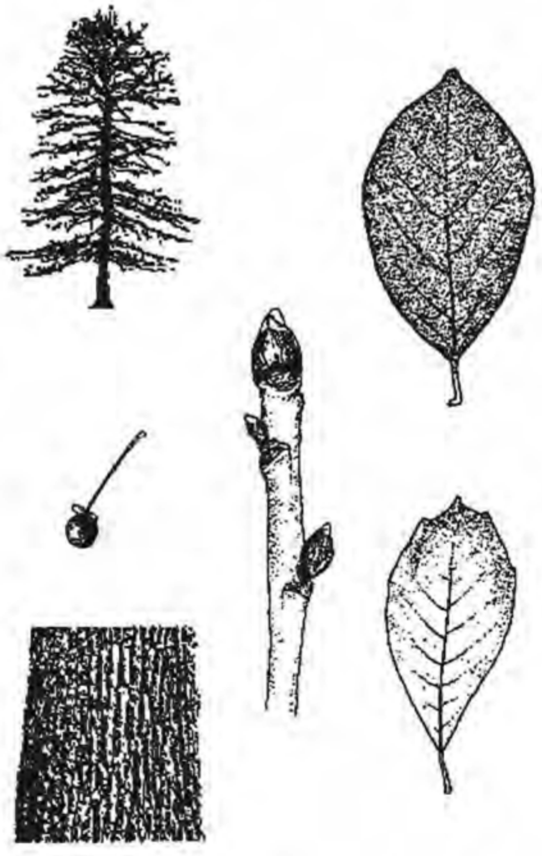
Twigs: Brown stout, hairless with ring scars at nodes. New growth shows stipules. Buds are shaped like a duck bill with 2 scales.

Bark: Dark gray, becoming with deep furrows. Trunks are straight and cylindrical.

Fruits: Conelike, light brown, with overlapping nutlets in a banana like arrangement.

Habitat: Establishes quickly on disturbed sites.

Nyssa sylvatica - Black Gum or Black Tupelo



Plant Group: Nyssaceae

Leaves: Alternate, simple, elliptical or oblong, not toothed, shiny green above, pale and often hairy on the underside. Turn bright red in fall. Some leaves have shallow lobes towards tip of leaf.

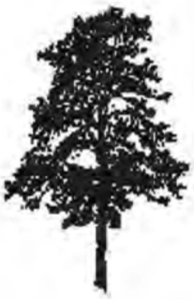
Twigs: Twigs are brown, slender, with some short spurs. Orange leaf scars. Buds are tri-colored in winter. Pith is chambered.

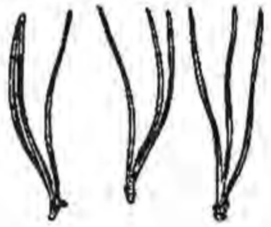
Bark: gray or dark brown, rough, deeply furrowed into rectangular or irregular ridges. Branches often grow at 90 degree angles from the trunk.

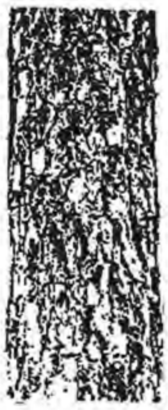
Fruits: Berrylike, elliptical, blue-black drupe with sour pulp. Single or in pairs on a long stalk.

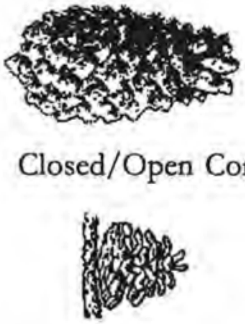
Habitat: Prefers mesic soils.

Pinus rigida - Pitch Pine









Closed/Open Cone

Plant Group: Pinaceae

Leaves: Needles are in bundles of 3, occasionally 2. Needles 3-5 inches in length, stout, and slightly twisted. Needles often grow directly out of the trunk of tree. Yellow-green

Bark: Dark and platy. Resembles bark of black cherry. Old trees show flat, square, orange-colored plates.

Fruits: Cones are heavily armored similar to Virginia Pine. Egg shaped, yellow-brown. Slender sharp prickle on cone scales.

Habitat: Occurs on upland slopes in dry, well-drained acidic soils.

Pinus virginiana - Virginia Pine

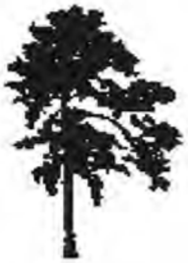
Plant Group: Pinaceae

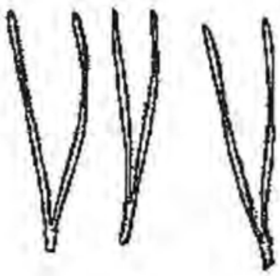
Leaves: Needles are in bundles of 2, short, slightly flattened, and twisted. Dull green in color.

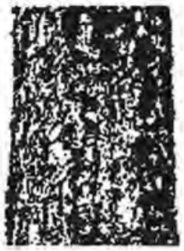
Bark: Brownish-gray, thin with narrow scaly ridges, becomes shaggy in old trees. In small trees smooth but peels off in flakes. Branches are scraggly or scrubby looking. Many dead persistent branches. Twigs may have a whitened appearance.

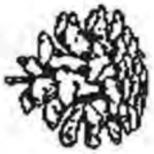
Fruits: Abundant cones are narrowly egg-shaped, shiny reddish-brown; almost stalkless. Cones open at maturity but remain attached to tree. Long slender prickle on cone scales.

Habitat: Occurs on upland ridges in dry, well-drained acidic soils.









Platanus occidentalis - American Sycamore or American Planetree

Plant Group: Platanaceae

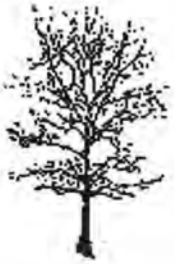
Leaves: Alternate, simple, and serrated. Three to five shallow broad short pointed lobes with large teeth. Leaves are wide and often broader than they are long. Smooth above with a slight hairiness on the veins underneath. Petiole bases are swollen and hollow, designed to completely cover the bud.

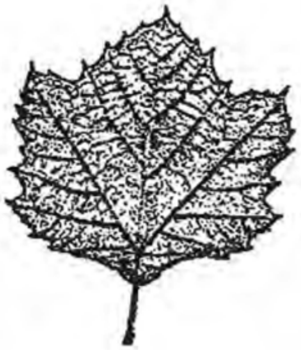
Twigs: Slender, greenish, zigzag with ring scars at nodes. Buds are "conehead" shaped with a single budscale.

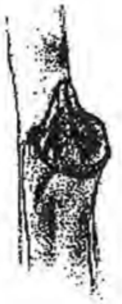
Bark: Bark is brown and flaky with a patchwork of various colors. Upper trunk and limbs are whitish and mottled. Base of large trees deeply furrowed.

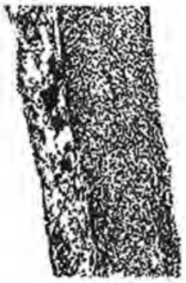
Fruits: Brown fuzzy balls on a long stalk the size of golf balls. Featherlike tufted nutlets.

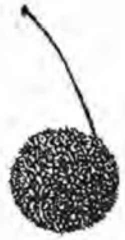
Habitat: Prefers wet soils.











Prunus serotina - Black Cherry or Wild Cherry

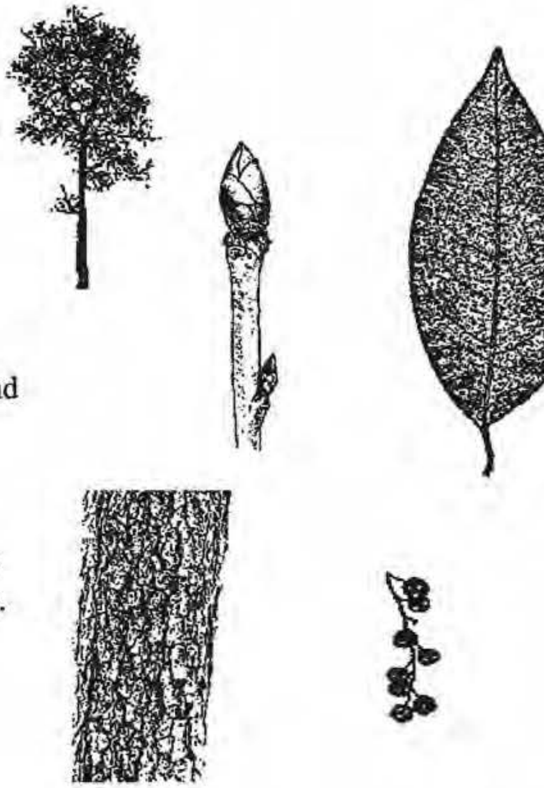
Plant Group: Rosaceae

Leaves: Alternate, simple, elliptical and finely serrate. Dark red glands at base.

Twigs: Shiny red-brown, slender, hairless. Buds are blunt with pointed scales. Broken twigs and crushed leaves smell like almonds and emit cyanic acid.

Bark: Young trees have shiny maroon bark with horizontal rows of white lenticels. Older trees have black plates resembling burnt cornflakes.

Fruits: Small blackish cherries with long racemes. Bitter but juicy, with elliptical stone.



Quercus alba - White Oak

Plant Group: Fagaceae

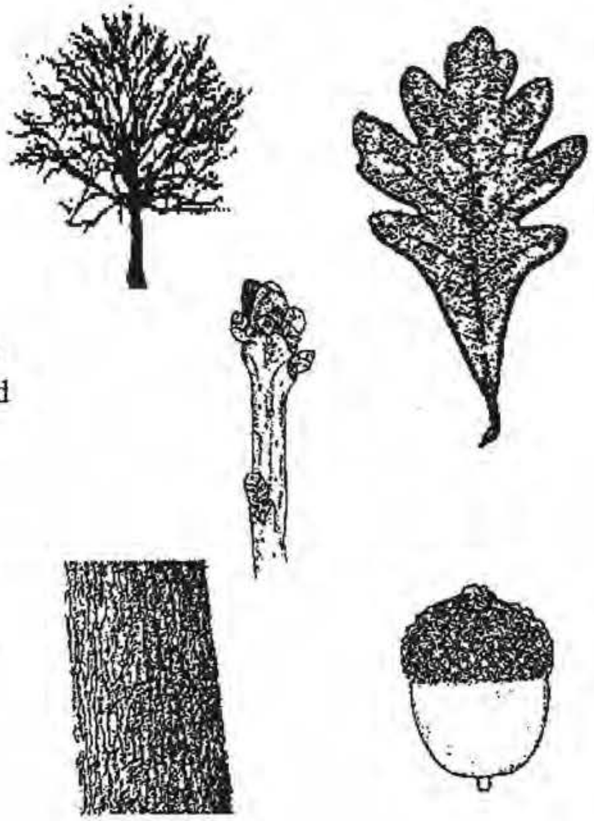
Leaves: Alternate, medium to deep smooth lobes, symmetrical. Hairless.

Twigs: Thinner twigs than most oaks with a glaucous coating in winter. Buds are small, rounded and clustered.

Bark: Light gray, flaky loose plates.

Fruits: Acorns egg-shaped, shallow caps with warty finely hairy scales.

Habitat: Well drained uplands and lowlands, prefers lower slopes.



Quercus coccinea - Scarlet Oak

Plant Group: Fagaceae

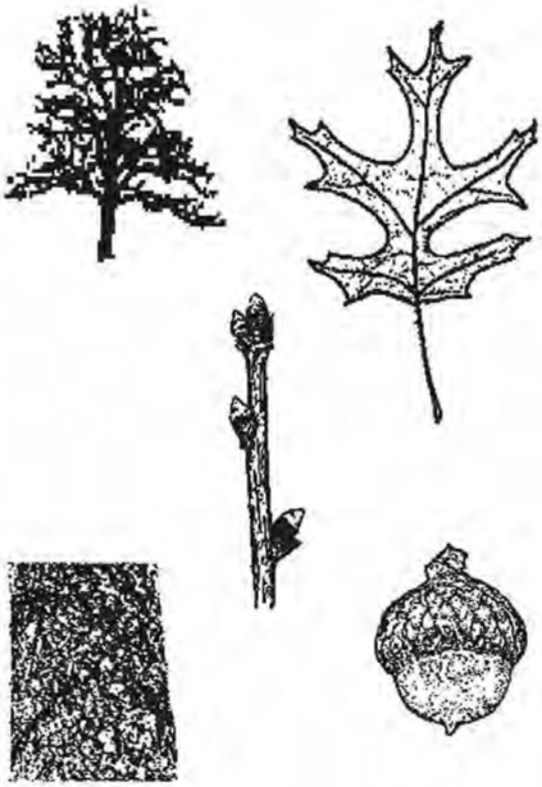
Leaves: Alternate, simple and variable. Deeply divided nearly to midvein. Normally 7-9 lobes. Each lobe ends in a bristle-tip. Long slender stalks.

Twigs: Reddish brown with rounded buds. Buds are red on the bottom and white on top.

Bark: Retains dead lower branches or lower branches droop. Base of trunk may appear swollen or cankered. Inner bark is reddish.

Fruits: Acorns often have 2-4 faint rings like a bull's-eye on the base. Enclosed in a deep top or bowl-shaped cap of tightly pressed scales and a stalk-like base. Scales look like snake skin or shingles.

Habitat: High dry slopes and ridgetops.



Quercus montana - Chestnut Oak

Plant Group: Fagaceae

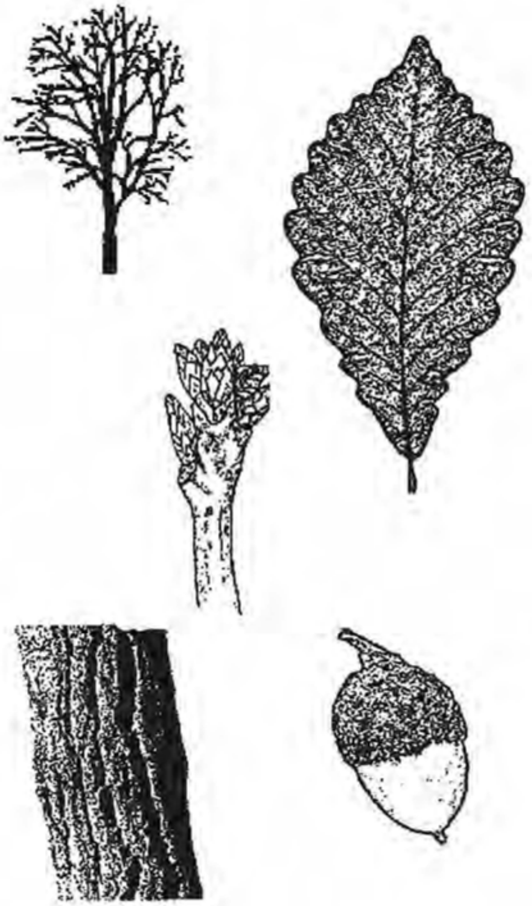
Leaves: Alternate. Lobes are shallow and even, with rounded wavy edges. Shiny green above, dull gray green beneath with sparse hairs. Leaves may be narrow or wide.

Twigs: Chestnut-brown in color. Long pointed buds.

Bark: Hard deeply furrowed gray bark.

Fruits: Football-shaped dark brown acorns with deep thin cap. Cap resembles a wine glass, and has short warty hairy scales which do not overlap.

Habitat: Found on ridgetops with high slopes and poor rocky soils as well as other sites.



Quercus rubra - Red Oak or Northern Red Oak

Plant Group: Fagaceae

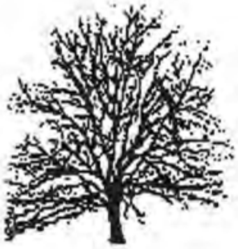
Leaves: Medium lobed leaves, divided less than half way to midvein. Shallow wavy lobes with a few irregular bristle-tips. Dull green color with tufts of hairs in angles along midvein.

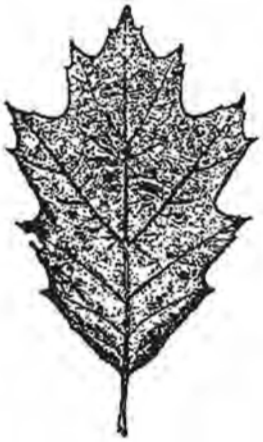
Twigs: Buds are red and smooth

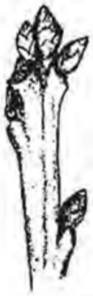
Bark: Rough, dark gray or blackish. Furrowed into scaly ridges. Inner bark reddish. Few if any dead lower branches.

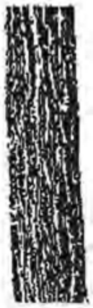
Fruits: Fat pumpkin shaped acorns. Caps look like a french beret covering only the very top of acorn.

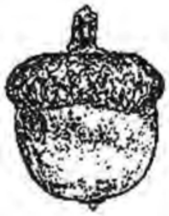
Habitat: Prefer mesic soils and north-facing slopes.











Quercus velutina - Black Oak

Plant Group: Fagaceae

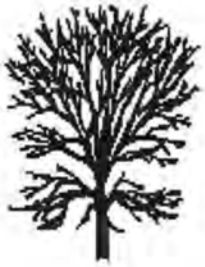
Leaves: 7-9 shallow lobes ending in a few bristle-tipped teeth. Hairy petioles, and brown hair tufts under leaf along the main veins.

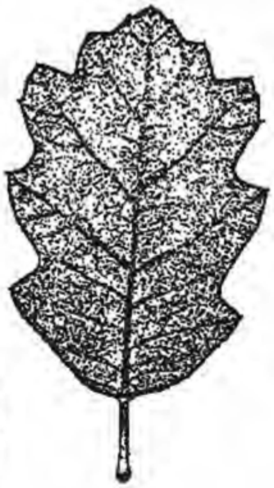
Twigs: Buds are pointed with hair-covered scales.

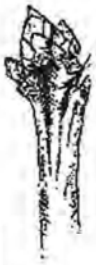
Bark: More blocky looking than many oaks, at base, but smoother at tops and on young tree. Bark feels dirty to touch and has a yellow or orange inner bark. Very bitter to taste.

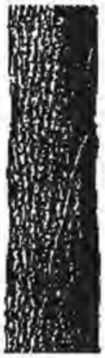
Fruits: Acorns are bowl shaped. Acorn cap scales lay flat except around the rim where they are erect and give the appearance of a fringe. Rough to the touch.

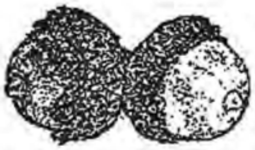
Habitat: Able to withstand poor sites and often found on south-facing slopes.

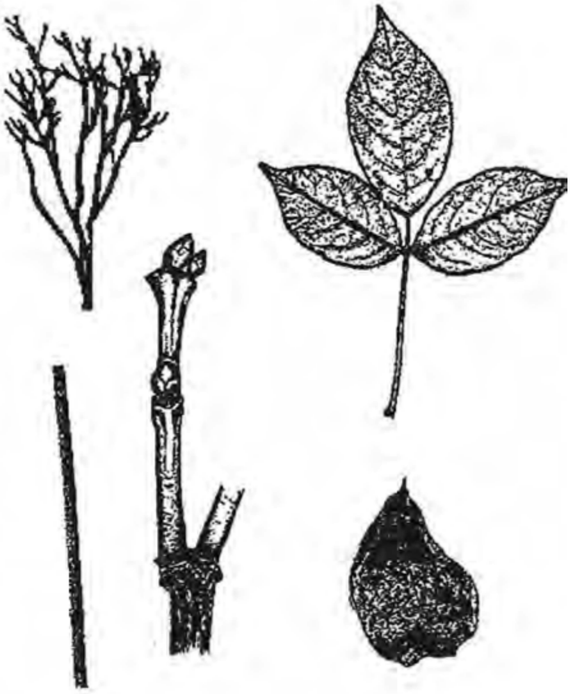












Staphylea trifolia - Bladdernut

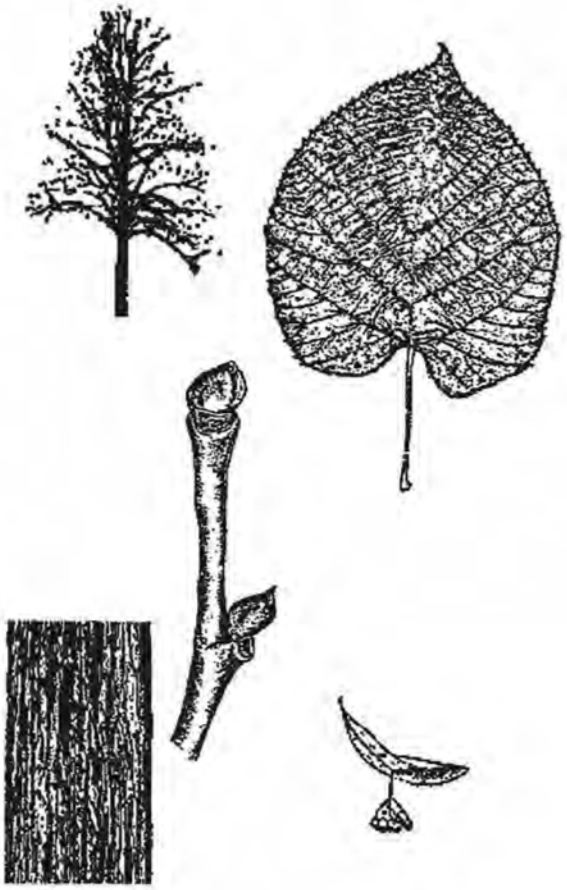
Plant Group: Staphylaceae

Leaves: Opposite, palmately compound, long slender stalks and 3 hairy leaflets. Light green, long pointed tips.

Twigs/Bark: Curved stems with brown with white markings, slightly fissured. Trunk looks speckled or striped. Buds are black, round, and in pairs.

Fruits: Drooping 3-sided light brown air filled bladder. Loose rounded shiny seeds create a rattle-like effect when shaken. Persistent until midwinter.

Habitat: Moist understory species. Often grows in thickets on limestone soils.



Tilia americana - Basswood

Plant Group: Tiliaceae

Leaves: Alternate, simple, large heart-shaped leaves with serrated margins. Leaves are very broad, with often oblique bases.

Twigs: Shiny with a zigzag growth pattern. New shoots turn bright red in winter. Two-scaled buds are bullet-shaped.

Bark: Gray brown smooth becoming furrowed into scaly ridges with age. Straight vertical fissures. Tree sounds hollow when hit and often exhibits stump sprouting.

Fruits: Light brown clusters of nutlike fruits on a leafy bract. Covered with fine hairs, hard with 1-2 seeds each. Often persistent into winter.

Habitat: Moist soils.

Viburnum prunifolium - Blackhaw or Cherry Leaf Viburnum

Plant Group: Caprifoliaceae

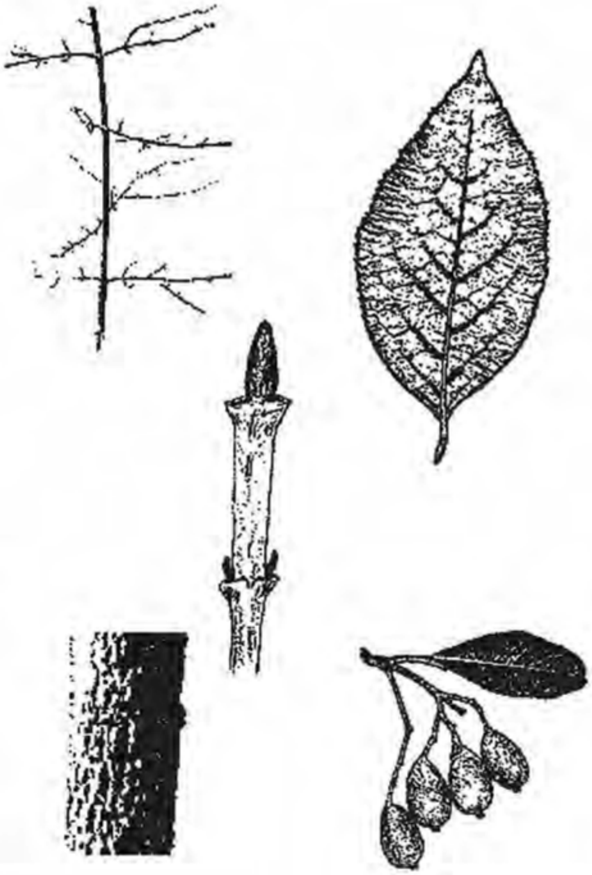
Leaves: Opposite, simple, finely serrate with teeth facing inware or upward, half as broad as long. Dull green, green to red petioles with broad grooves.

Twigs: Hairless and stiff with branches growing out from trunk in all directions. Plant has the appearance of an old TV antenna. Short lateral spurs. Pinkish gray buds are spear-like. Flower buds swell to rounded with a top-knot.

Bark: Smooth bark becomes warty as the plant ages. Flat squarish ridges with shallow furrows.

Fruits: Clusters of dark blue berries with a white coating. Egg shaped berries are thin fleshed and dry tasting. Solitary seed, grooved on one side.

Habitat: Base and edge of bluffs, in forest edges and in understory.



Viburnum dentatum - Arrow wood or Dentate Viburnum

Plant Group: Caprifoliaceae

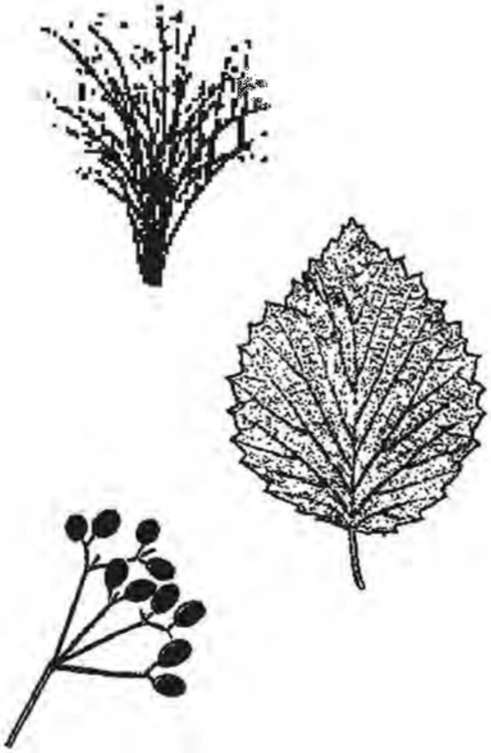
Leaves: Opposite, simple with margins which have large coarse teeth. Triangular, heart-shaped, or egg-shaped with prominent veins ending in the teeth. Leaves vary from smooth to downy.

Twigs: Slender straight or arching, young branches are hairy, older ones are smooth. Twigs vary from smooth and round to ridged or angled.

Bark: Tight, smooth, gray with cream colored lenticels prominent.

Fruits: Clusters of small blackish berries. Single-seeded, seeds have deep groove on one side.

Habitat: low alluvial woods and streamsides.



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